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The Sexual Responses of Women with a History of Child Sexual Abuse

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The Sexual Responses of Women

With a History of Child Sexual Abuse

by

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Dedication

I dedicate this work to the hundreds of women who participated in these studies. It was an inspiration hearing women's stories of how they survived adversities and how they fought to regain their freedom from nightmares and from countless years of abuse. It is even more inspiring to witness how these women are still fighting to rebuild their intimate relationships despite the surprisingly scarce resources available for women who have been sexually abused and want treatment for sexual problems. It is my hope that this work will be the beginning of a long career dedicated to answer these questions and finding solutions for those women who have allowed me to peak into their sexual lives but have yet to receive an effective treatment for their sexual distress.

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The Sexual Responses of Women

With a History of Child Sexual Abuse

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Theoretical and epidemiological studies indicate that women with a history of child sexual abuse (CSA) experience more sexual problems during adulthood compared to non-abused women. Despite the abundance of research conducted on prevalence and incidence of sexual difficulties associated with a history of CSA, very little is known on the psychophysiological sexual response of CSA survivors. A study was conducted to

examine whether women with and without a history of CSA differed in their physiological and subjective sexual responses when exposed to erotic videos. A second study was conducted to explore potential predictors of the physiological and subjective sexual responses of women with a history of CSA.

Overall, the physiological sexual arousal of CSA survivors was not significantly weaker than the response of women with no history of CSA. However, when controlling for levels of sexual distress and sexual function those CSA survivors with higher levels of sexual distress showed lower physiological sexual arousal compared to CSA survivors with less sexual distress. In agreement with prior studies, for women with no history of CSA the relationship between levels of distress and physiological sexual arousal was not significant. Similarly, levels of subjective sexual arousal reported in the laboratory were associated with sexual distress in CSA survivors but not in women with no history of CSA. Women who reported more re-experiencing symptoms and more negative affect before the erotic video showed a significantly lower increase in subjective sexual arousal in the presence of an increase in physiological sexual arousal. Cortisol levels measured before and after exposure to the erotic video indicated that higher dissociation experienced during the sexual interaction with a partner is associated with a cortisol secretion during exposure to sexual stimuli. This finding suggests a potentially learned stress response to erotic stimuli which may negatively affect the physiological sexual arousal for a subgroup of CSA survivors.

Findings from the two studies suggest that the psychophysiological assessment of the sexual response of CSA survivors captures some important aspects of the sexual

difficulties experienced by these women. A number of potential predictors of the physiological and the subjective sexual responses of CSA survivors were identified. Future studies will need to examine whether interventions that target these predictors can help CSA survivors to increase their physiological and subjective sexual arousal to sexual cues and whether this provides some relief to their sexual distress.

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CHAPTER 1: Introduction

Although the majority of women show a spontaneous remission within four years from the sexual abuse (Burgess & Holmstrom, 1979), a large percentage of survivors continues to report distress for decades after the incident. The most common psychological consequences of child sexual abuse (CSA) include eating disorders, borderline personality disorder, posttraumatic stress disorder (PTSD), dissociation, depression, alcohol/drug abuse, body dissatisfaction, and sexual dysfunction.

A review of 38 studies reported that across methodologies, samples, and measures, CSA is a risk factor for adult sexual dysfunction (Neumann, Houskamp, Pollock, & Briere, 1996). Considering that 90,000 children in the U.S. were found sexually abused in 2002 (National Child Abuse and Neglect Data System, 2003), an alarmingly large portion of adult women is at risk for sexual dysfunction associated with CSA.

This dissertation focused on the sexual arousal of women with a history of CSA. Sexual arousal is defined by the Diagnostic and Statistical Manual of Mental Disorders (*DSM-IV-TR*; American Psychiatric Association, 2000) as mostly a physiological response to an erotic cue: "The arousal response consists of vasocongestion in the pelvis, vaginal lubrication and expansion, and swelling of the external genitalia" (p. 543). Lately, researchers and clinicians have proposed a distinction in the categories of female sexual arousal dysfunction, suggesting a differentiation between physiological sexual arousal, mental (or subjective) sexual arousal and a mixed category of physiological and mental sexual arousal (Basson, et al., 2003).

Despite the wealth of literature available on sexual arousal function, researchers have yet to come to an agreement on a sexual model for female sexual arousal. Barlow

(1986) proposed a model for male sexual arousal function that focused on implicit and explicit demands and performance expectations. This model has been useful in the assessment and treatment of male sexual dysfunction. However, studies investigating the applicability of this model to female sexuality have reported conflicting results (e.g., Heiman, 1977; Janssen & Everaerd, 1993; Delizonna, Wiegel, Scepkowski, Jensen, Ramsawh, Brown, et al. 2001). The "Dual–Control" Model is a theoretical approach that focuses on the combination of excitation and inhibition of physical and subjective sexual responses to explain sexual arousal in men (Bancroft & Janssen, 1990). Only recently, a series of qualitative and quantitative studies have attempted to translate this model to female sexual arousal (Graham, Sanders, Milhausen, & McBride, 2004). To date, very little empirical evidence is available to either accept or reject either one of these models for female sexuality. What appears as a common theme in both models is an attempt to combine both physiological and subjective sexual responses for the understanding of sexual arousal function.

1.2. Physiological Sexual Response

The operationalization of physiological sexual response is an increase in engorgement of the vaginal walls, the inner labia, and the clitoris. Differently from men, the engorgement observed in women during the physiological sexual response is thought to be the product of an increase in blood flow rather than the trapping of the blood in the genitals through veno-occlusion caused by neuropeptide Y (Alsaita, Rellini, Meston, & Levin, 2006; Nader, Maitland, Munariz, & Goldstein, 2005). To date, the assessment of physiological sexual arousal in women has focused primarily on detecting changes in vaginal blood flow in the presence of a sexual stimulus presented through a fantasy, a

video, or an audiotape. Vaginal engorgement occurs in unison with vaginal lubrication and together these two phenomena provide the first measurable physiological signs of sexual arousal in women. The three primary means of assessing vaginal blood flow are vaginal photoplethysmography, indirect measures of heat dissipation, and pulsed wave doppler ultrasonography (for review see Meston, 2000). The most frequently used of these is vaginal photoplethysmography, a technique introduced by Sintchak and Geer (1975). The vaginal photoplethysmograph is a clear acrylic, tampon-shaped device used to detect engorged and unengorged tissue. The vaginal probe was designed to be easily inserted by the participant and a positioning shield can be placed on the probe's cable in order to standardize the depth of insertion between uses (Laan, Everaerd, & Evers, 1995). The most reliable and sensitive (Laan, et al., 1995) component of the signal is vaginal pulse amplitude (VPA), measured from the peak to the trough of the pulse wave, which is believed to reflect phasic changes in vaginal engorgement with each heartbeat, meaning that higher amplitudes indicate greater engorgement (e.g., Geer, Morokoff, & Greenwood, 1974). Analyses of vaginal pulse amplitude are usually conducted by averaging across presentations of non sexual and sexual stimuli, computing the difference between the highest 20-30 seconds of arousal during the sexual stimuli and the non sexual stimuli (maximum differences), or across selected time intervals during the sexual and the non sexual stimuli.

1.3. Subjective Sexual Arousal

With regard to the assessment of subjective sexual arousal, measurement usually involves asking the woman about her subjective experience of arousal during a prior sexual scenario. In laboratory settings, the woman typically responds to questions about whether (and to what degree) she felt “sexually aroused” or “turned on” during the

preceding sexual video. A commonly used instrument is a 7-point Likert Film Scale introduced by Heiman and Rowland (1983) that has since been adapted and expanded upon by many researchers (e.g., Meston & Gorzalka, 1995). These questionnaires ask about feelings of subjective sexual arousal, physical sexual arousal (e.g., warmth in genitals, genital wetness or lubrication), positive affect, negative affect, autonomic arousal (e.g., faster breathing, faster heartbeat), and anxiety. Additionally, other researchers have relied on answers to women's ratings of "strongest genital sensations" (e.g., Henson & Rubin, 1978), "overall sexual arousal" (e.g., Laan, Everaerd, van Bellen, & Hanewald, 1994), and "romantic feelings" (e.g., Wilson & Lawson, 1976) to indicate subjective sexual arousal.

In response to criticism that self-report measures of subjective sexual arousal rely on retrospective recall of sexual feelings, some researchers have developed techniques for the continuous assessment of sexual response. Wincze, Hoon, and Hoon (1977) were the first to employ this type of methodology by using a lever mounted to a table, which could be moved by the participant throughout the presentation of non-sexual and sexual videos to indicate levels of arousal. Laan and colleagues have also employed continuous measures of subjective sexual arousal in laboratory studies investigating female sexual arousal (e.g., Laan, Everaerd, van Aanhold, & Rebel, 1993; Laan, Everaerd, van der Velde, & Geer, 1995). More recently, Rellini et al. (2006) have assessed continuous measures of subjective sexual arousal throughout the exposure to neutral and erotic stimuli by using the Arousometer. The Arousometer comprises a computer mouse mounted on a wooden track. The participant can move the mouse back and forth during the film to indicate their levels of subjective sexual arousal while a software program detects the position of the mouse with the respect to the track every 0.5 sec.

1.4. The Relationship between Physiological and Subjective Sexual Arousal

There is much controversy on whether physiological sexual responses are associated with subjective experiences of sexual arousal. From a theoretical point of view, Geer (1976) proposed that, differently from other the physiological reactions noted during emotions such as fear or anger, sexual arousal is expected to show a higher relationship between the physiological and subjective manifestations. Geer justifies this assumption on the basis that while physiological responses such as sweating during a state of fear has little effect on the stimulus feared, sexual arousal can facilitate the sexual behaviors. In men, this is obvious since sexual intercourse cannot occur without erection, however this relationship is more complicated for women. Indeed, the literature has pointed at a large discrepancy between the relationship between physiological and subjective sexual arousal in women compared to men. A recent meta-analysis based on 109 studies published between 1969 and 2003, reported that, on average, the relationship between physiological and subjective sexual arousal is r = .32 (Chivers, Seto, Lalumiere, Laan & Grimbos, 2005). However, different studies have used different methodologies to investigate the relationship between physiological and subjective sexual arousal, thus findings cannot be adequately compared.

A study using a continuous measure of subjective sexual arousal, the "Arousometer" (see Appendix A), in combination with hierarchical linear modeling (HLM) analysis, investigated the relationship between physiological (VPA) and subjective sexual arousal within exposure to non-sexual and sexual video stimuli (Rellini et al., 2006). This approach allowed for the investigation of the relationship between physiological and subjective sexual arousal within exposure to one video. Since the between participants variance in VPA and the lack of absolute zero in this measure are

some of the limitations of the data, HLM provides a useful tool to measure group differences while taking into consideration high between participants differences. Results from this study indicate that, overall, women show a strong relationship between physiological and subjective sexual arousal. Interestingly, a large unexplained variance between women was reported (χ^2 (20) = 1525.10, $p < .001$), with some women showing a strong relationship between physiological and subjective sexual arousal and other women showing no substantial relationship. Appendix B illustrates the variance in the strength of the physiological/subjective relationship between women. This wide variability may explain why some studies have found a significant relationship between these two measures (Dekker & Everaerd, 1988; Henson, Rubin, & Henson, 1979; Wincze, Hoon, & Hoon, 1977) while other studies have not (Geer, Morokoff, & Greenwood, 1974; Laan, Everaerd, van Aanhold, & Rebel, 1993; Laan, Everaerd, van Bellen, & Hanewald, 1994; Laan, Everaerd, van der Velde, & Geer, 1995; Meston & Gorzalka, 1995; Osborn & Pollack, 1977; Wilson & Lawson, 1976; Wincze, Venditti, Barlow & Mavissakalian, 1980).

Studies conducted on women with female sexual arousal dysfunction have failed to find a relationship between this sexual dysfunction and the strength of the relationship between physiological and subjective sexual arousal (Meston, Rellini, & McCall, 2005). This indicates that the relationship between physiological and subjective sexual responses is not directly implicated in women's sexual arousal problems among women recruited from the community.

1.5. A History of CSA and Sexual Arousal Function and Dysfunction

Concerns with sexual arousal appear frequently in survivors of CSA recruited from the community (Becker et al., 1982; Briere, 1992; Fergusson & Mullen, 1999) and from clinical populations (Westerlund, 1992; Becker et al., 1982; Becker, 1982, Skinner, Abel, & Cichon, 1986). In particular, sexual arousal problems secondary to CSA have been linked to fear of being out of control, guilt or shame for the abuse (Westerlund), guilt during sexual arousal (Heiman, Gladue, Roberts, & LoPiccolo, 1986), age at the time of the abuse, repeated incidents of abuse, and knowing the assailant (Becker et al., 1986). In these studies, information on sexual arousal concerns of women with and without a history of CSA was collected using retrospective self-report questionnaires.

To date, very little information is available on the mechanisms of physiological and subjective sexual arousal of women with a history of CSA. Only one study has investigated the role of the sympathetic nervous system on the physiological sexual response in women with a history of CSA (Rellini & Meston, 2006). In contrast to the enhancing effect of the sympathetic nervous system on physiological sexual arousal in women with no history of CSA (e.g., Meston & Gorzalka, 2005), increased sympathetic activity had no effect on the physiological sexual arousal of women with a history of CSA. This finding suggests that the sexual difficulties experienced by CSA survivors may include both physiological and psychological factors.

Understanding the relationship between physiological and subjective sexual responses is particularly pertinent to the study of women survivors of CSA given survivors' reports of feeling "disconnected" from their bodies (Mills & Daniluk, 2002). After interviewing CSA survivors, Mills and Daniluk reported that women talked about a

rejection of their bodies because they experienced their bodies as fragile and responsible for attracting the assailants. Survivors of CSA that followed a treatment specifically designed to increase the "mind-body connection" have reported an increased sense of wholeness and "integration" that participants linked to a greater sense of control and safety in intimate connections with others (Mills & Daniluk). Additional evidence of a disconnect between the physical and the subjective sexual responses of CSA survivors is provided by clinical observation of women with a history of CSA reporting a lack of feelings during sexual activities with their partners, even when experiencing an orgasm (Herman & Hirschman, 1977). It is likely that this disconnection may impact the relationship between physiological and subjective sexual arousal in survivors of CSA. Indeed, a study investigating the relationship between physiological and subjective sexual responses in women with (N = 18) and without (N = 10) a history of CSA found that CSA survivors had a significantly weaker physiological/subjective relationship than women with no history of abuse (Rellini & Meston, 2006). It remains unclear how this relationship may be associated with the sexual function of CSA survivors. Given this preliminary finding and clinical observations, it is feasible that in women with a history of CSA, the association between physiological and subjective sexual arousal may play a bigger role in female sexual function than for women with no history of abuse.

1.6. Characteristics of the Abuse and Sexual Functioning

A variety of factors may be implicated in the pattern of physiological and subjective sexual responses of CSA survivors. A greater understanding of the predictors of physiological and subjective sexual arousal and how these predictors are associated

with levels of sexual function is paramount for the development of treatments for the sexual dysfunction experienced by CSA survivors. The factors affecting conscious processes in women's sexual responses have been hypothesized to include affective state, individual characteristics (e.g., sexual attitudes), prior sexual experiences, setting or circumstances, and amount of genital arousal detected (Laan, Everaerd, van der Velde, & Geer, 1995).

1.7. Consequences of CSA on Sexual Dysfunction

Long-term consequences of CSA that can affect physiological and subjective sexual arousal and the relationship between the two variables include dissociation, eating disorders, body dissatisfaction, alcohol/drug abuse, cognitive schemas, posttraumatic stress, and stress. It follows a review of how impairments in these areas can affect sexual function.

1.7.1. Dissociation in CSA Survivors and Sexual Functioning

Dissociation, one of the symptoms most commonly linked to a history of CSA, can be interpreted as a defense mechanism originally used by the child to distance her self from the abuse. During the dissociation the individual is not attending the present stimuli and may not be aware of the sensations in her body. This form of self-defense can later become a problem because often it presents as an automatic response outside the control of the individual and therefore is experienced as a further loss of control in a

situation that is highly upsetting. Sex therapists have indeed emphasized the importance of using "grounding" techniques with sexual abuse survivors to prevent dissociation during sexual encounters (Ashton, 1995). In addition to impacting subjective sexual arousal by reducing the attention to the sexual stimuli, dissociation can also have a negative impact on the physiology of sexual arousal. Elevated glucocorticoid secretion in response to stress has been noticed in people experiencing dissociation (Morgan, Wang, Southwick, Rassmusson, Hanger & Charney, 2001). Glucocorticoids have an inhibitory effect on the nucleus coerelus, one of the major centers for the production of norepinephrine, a primary neurotransmitter utilized by the sympathetic nervous system. Studies on the sympathetic nervous system and physiological sexual arousal have suggested that a moderate activation of the sympathetic system is associated with greater physiological sexual arousal (Meston & Gorzalka, 1995; Bradford & Meston, 2006). It is therefore plausible that both the physiological sexual response and the physiological/subjective relationship may be negatively affected by dissociation in CSA survivors.

1.7.2. Eating Disorders in CSA Survivors and Sexual Functioning

Although bulimia is a common psychiatric diagnosis among CSA survivors, little is known about the relationship between eating disorders and sexual function (for a review, see Wiederman, 1996). A recent study by Tripp and Petrie (2001) found support for the hypothesis that eating disorders of sexual abuse survivors are predicted by bodily shame which in turn predicts the experience of body degradation or body loathing (Kearney-Cooke & Streigel-Moore, 1994). Provided that body image has been associated with sexual function (e.g., Ackard, 2000; Goldenberg, McCoy, Pyszczynski, Greenberg,

& Solomon, 2000), it is possible that body image may partially predict the sexual problems of women with a history of CSA experiencing eating disorders. In particular, it is feasible that women with more body image problems and more eating problems may experience less synchronicity between physiological and subjective sexual arousal which may be associated with sexual function. In support of this hypothesis, a study found that body image moderated the relationship between adult sexual functioning and CSA (Wenninger & Heiman, 1998).

1.7.3. Alcohol and Drug Abuse of CSA Survivors and Sexual Functioning

Alcohol/drug abuse or dependence is common among women with a history of CSA. Drugs are often used by CSA survivors during the sexual encounter to reduce negative emotions (i.e., anxiety, depression, reduced self-esteem) (Wilsnack, Vogeltanz, Klassen, & Harris, 1997), which consequently creates a greater disconnection between physiological and subjective sexual arousal.

1.7.4. Sexual Self-Schemas of CSA Survivors and Sexual Functioning

The impact of CSA is not restricted to the behavior and physical health of survivors, but it also infiltrates their schemas (Herman, 1992). Schemas may be thought of as the blueprints of how to interpret and respond to the world. They are used to organize bits of information into coherent pictures (Meares, 1998), to make decisions about the present, and to determine future directions (Horowitz, 1998; Markus, 1977; Rowan, 1997). Schemas about safety, others, and the self have been found negatively

affected by trauma (Dutton, Burghardt, Perrin, Chrestman, & Halle, 1994), and have been shown partly responsible for the maintenance of psychological syndromes such as PTSD (Ehlers & Clark, 2000; Foa, Steketee, & Rothbaum, 1989). It is feasible that sexual trauma may alter other types of schemas as well, such as sexual self-schemas. According to the sexual arousal model presented by Janssen, Everaerd, Spiering and Janssen (2000) sexual arousal is composed of physiological, psychological (cognitive and affective), and behavioral components. When a woman is exposed to sexual cues, Janssen and colleagues argue that automatic processes regulate the appraisal of a sexual stimulus, thus deciding the reaction a person has to a sexual cue at a preconscious level. According to the literature on self-schemas, associations and cognitive networks that exist at a preconscious level are based on the schemas of the individual. Therefore, it can be argued that sexual self-schemas may regulate the negative appraisal of sexual cues, which could help explain a low subjective sexual arousal response in the presence of a normal physiological sexual response.

Schemas have gained popularity in the study and development of treatments because of their impact on behavior. One of the ways in which schemas exert their power on behavior is by guiding attention. People are constantly bombarded with a larger amount of information than they are able to process, therefore conscious and unconscious filters are fundamental to orient attention towards relevant information. The association between schemas and attention has been demonstrated in studies showing that people have a tendency to pay more attention to information that confirms versus contradicts their self-schemas, even in the presence of negative self information (Swann, Wenzlaff, Krull, & Pelham, 1992). The relationship between attention and schemas is not unidirectional. In fact, while attention filters what is stored into memory and is later used to build schemas, schemas direct attention by deciding what one should attend. An

example of this circular relationship is the trauma survivor that scans the environment for potentially threatening elements in order to avoid further trauma. Selective attention to potentially harmful elements in the environment reflects the schema of an unsafe world and, at the same time, provides evidence to strengthen the schema of a dangerous world. This theory has received support from studies showing that PTSD patients allocate more cognitive resources toward threatening stimuli than non-threatening stimuli, and more so than non-traumatized controls (Foa, et al., 1989). In summary, schemas are involved in the following two important functions: 1) directing attention towards those elements that are in agreement with the schemas, and 2) shaping behaviors and reactions to different situations.

A few initial studies on sexual abuse survivors have provided evidence that there may be differences between the sexual self-schemas of CSA survivors and those of healthy controls. A study employing a self reported questionnaire called the Sexual Self-Schemas Scale (SSSS; Andersen & Cyranowski, 1994) found that, in a sample of women with vaginismus, participants with a history of CSA had lower positive sexual schemas (romantic/passionate and openness/directness) and similar negative sexual schemas (embarrassment/conservatism) as compared to healthy controls (Reissing, Binik, Khalife, Cohen, & Amsel, 2003). The SSSS consists of 30 trait adjectives that participants rate on a scale of how accurately the trait describes themselves (Andersen & Cyranowski, 1994). A recent study by Meston, Rellini & Heiman (2006) used the SSSS to investigate the potential mediational role of sexual self-schemas in the relationship between CSA and sexual functioning. The results of this study provided initial support to the hypothesis that negative affect experienced during sexual activities by women with a history of CSA is mediated by the passionate/romantic sexual self-schemas even when controlling for depression and anxiety. These results further corroborate the presence of a difference in

the sexual self-schemas of women with and without a history of CSA. Moreover, these results can be interpreted as further evidence that the sexual self-schemas of women with a history of CSA mediate the appraisal of sexual cues, which in turn may suppress subjective sexual arousal despite physiological sexual arousal.

Further evidence that sexual stimuli may illicit negative affect in survivors of CSA is provided by cognitive processes studies. In one of such studies (Meston & Heiman, 2000), women with and without a history of CSA rated pairs of words on a continuous scale from "highly similar" to "dissimilar." The words were based on six groups: positive evaluation (e.g., pleasurable), negative evaluation (e.g., distasteful), female genitalia (e.g., vagina), male genitalia (e.g., penis), interpersonal relationship (e.g., affectionate), and sexual behavior (e.g., lovemaking). Overall, women in the CSA group rated a stronger relationship between sexual behavior words and negative evaluation words as compared to non-abused women. This indicates that the cognitive networks used to make simple associations, which are the building blocks for perception, may be significantly influenced by CSA experiences.

In summary, sexual self-schemas direct the ways in which we perceive and interpret sexual events. Given that women with a history of CSA have been observed to have different sexual self-schemas, and that sexual self-schemas are a primary link in the sexual arousal process, it is feasible that cognitive interpretations of sexual cues may be affecting the discordance between subjective feelings of arousal and physiological reactions to sexual cues.

1.7.5. PTSD in CSA Survivors and Sexual Functioning

There is a high incidence of PTSD among CSA survivors (Rowan, Foy, Rodriguez, & Ryan, 1994). PTSD is characterized by symptoms of intrusive memories,

avoidant behavior, and hyperarousability. Intrusive memories appear as visual (e.g., flashbacks), physiological (e.g., fight or flight reaction), and emotional (e.g., strong fear or anxiety) experiences. Survivors are often unaware of the triggers that evoke these memories. Empirically validated therapies, such as guided exposure, have been developed to help survivors to assimilate their experiences (Foa, Dancu, Hembree, Jaycox, Meadows, & Street, 1999). The goal of guided exposure is to reduce the association between traumatic memories and the fight-or-flight reaction. This is accomplished by guiding the survivor through a detailed recall of the abuse during which she is encouraged to focus on the details of the memories and the emotions she experienced (Foa, et al., 1999).

PTSD has been studied as a potential moderator in the relationship between CSA and sexual dysfunction (e.g., Letourneau, Resnick, Kilpatrick, Saunders, & Best, 1996; Rellini & Meston, 2006). In one of such studies, PTSD predicted variance in sexual functioning in CSA survivors even after accounting for other psychological dysfunctions, characteristics of the abuse, and time elapsed since the abuse (Letourneau, et al., 1996).

The two symptoms of PTSD most likely to affect the relationship between physiological and subjective sexual arousal are unwanted memories and avoidant behavior. During sexual encounters, it is likely that memories of past sexual abuse are triggered in PTSD patients with a history of CSA. The memories are likely to cause increased negative affect and a physiological fight-or-flight response, which may interact negatively with positive subjective sexual responses. Often, women with a history of CSA will report using alcohol or dissociation to desensitize themselves to these unwanted memories.

Avoidant behaviors are also symptomatic of PTSD and may negatively impact the relationship between subjective and sexual arousal function (Merrill, Guimond, Thomsen,

& Milner, 2003; Pistorello & Follette, 1998). Avoidant behaviors are usually framed in the context of avoiding triggers of unwanted memories. If sexual activities are associated with unwanted memories, patients with PTSD may develop a chronic avoidance of behaviors that lead to sexual activities. Based on knowledge gleamed from studies on avoidant behavior in anxiety disorders, behavioral avoidance can strengthen the association between sexual activities and negative responses to physiological sexual responses.

1.7.6. Cortisol Levels in PTSD Patients and Sexual Functioning

An important aspect of PTSD that has been overlooked by researchers is the physiological contribution of PTSD to the sexual dysfunction of CSA survivors. Studies conducted on women with PTSD show increased sympathetic nervous system baseline levels and impairments in the hypothalamic-pituitary-adrenal (HPA) axis (Yehuda, 2003). This is relevant to sexual functioning because the sympathetic nervous system is also thought to play an important role in female sexual arousal (e.g., Meston & Gorzalka, 1995). Levels of sympathetic nervous system activity naturally increase during sexual activity and norepinephrine has been shown to increase during orgasm in both men and women (Krüger, Exton, Pawlak, von zur Mühlen, Hartmann, & Schedlowski, 1998; Exton, Bindert, Krüger, Scheller, Hartmann, & Schedlowski, 1999). Studies conducted in laboratory settings show a significantly greater increase in norepinephrine levels and sexual arousal in response to erotic videos as compared to levels of norepinephrine during non-erotic videos (Exton, et al., 1999). Recently, in a study designed to assess potential differences in dopamine and norepinephrine responses to erotic stimuli between sexually functional and dysfunctional women, Meston and McCall (2005) found that sexually dysfunctional

women had significantly higher levels of norepinephrine during the presentation of both nonsexual and sexual videos compared with sexually healthy women, suggesting norepinephrine responses to sexual stimuli may be a marker of women's sexual dysfunction. In a series of studies by Meston and colleagues (Meston & Gorzalka, 1995, 1996a; Meston, Gorzalka, & Wright, 1997; Meston & Heiman, 1998), activation of the sympathetic nervous system via either acute intense exercise or 50 mg ephedrine was found to have a facilitative effect on levels of physiological sexual arousal. An additional study by Meston and Gorzalka (1996b) suggested that there may be an optimal level of autonomic nervous system activity that facilitates sexual arousal and that too much or too little autonomic activity may have a detrimental impact on physiological sexual responding.

During a stressful (non-traumatic) experience, the sympathetic nervous system becomes activated and releases catecholamines, such as norepinephrine, which increase glucose availability, heart rate, and blood pressure (Bremner, Krystal, Charney, & Southwick, 1996). After a non-traumatic stressor, the body returns to its original state. However, after a trauma, the homeostasis of the individual is often altered and this is associated with the development of PTSD. The literature on veterans and adult survivors of CSA shows that baseline levels of sympathetic nervous system activity are higher in trauma survivors with PTSD than in healthy control women (e.g., Yehuda, 2003; Southwick, Paige, Morgan, Bremner, Krystal, & Charney, 1999).

Cortisol has been widely studied in women with a history of CSA and with PTSD. Cortisol is a hormone that acts on the negative feedback loop of the stress response (Appendix D). During acute exposure to a stressor, cortisol is released by the adrenal cortex to down regulate the activity of the amygdala, the pituitary, the locus coeruleus, and the hypothalamus. The locus coeruleus is the primary producer of norepinephrine,

which is the major neurotransmitter used by the sympathetic nervous system. Findings have shown that the HPA axis is negatively affected by early traumatic experiences (Southwick, Yehuda, & Morgan, 1995), and studies comparing persons with and without PTSD consistently show differences in levels of baseline cortisol. However, the direction of the effect is inconsistent, with some studies reporting higher levels of cortisol (e.g., Atmaca, Kuloglu, Tezcan, & Onal, 2002; Gotovac, Sabioncello, Rabatic, Berki, & Dekaris, 2003; Lemieux & Coe, 1995; Liberzon, et al., 1999; Lindley, Carlson, & Benoit, 2003; Pitman & Orr, 1990) and others reporting lower levels of cortisol (e.g., Kanter et al., 2001; Yehuda, et al., 1995; Yehuda, Southwick, Nussbaum, Wahby, Giller, & Mason, 1990; Thaller, Buljan, & Marušic, 1999) among persons with PTSD as compared to controls.

Bremner et al. (2003) recently explained these discrepancies in terms of cortisol responses in the presence versus absence of a stressor. They hypothesized that lower levels of cortisol may be present during a state of compensation, when there are no active traumatic reminders of the stressors, and higher levels of cortisol may occur in the presence of high stressors in the individual's life. Indeed, in a comprehensive study of levels of plasma cortisol measured every 15 minutes for 24 hours in the absence of a stressor, cortisol levels measured in the late afternoon were lower in women with a history of CSA and PTSD as compared to controls (Bremner et al.). Consistent with the notion that cortisol levels were higher in persons with PTSD in the presence of a stressor, Elzinga, Schmahl, Vermetten, van Dyck, and Bremner (2004) found higher cortisol levels among PTSD patients during exposure to a traumatic script, during recovery, and in the period leading up to the script exposure as compared to the cortisol levels in control women.

Lower levels of cortisol may lead to excessive sympathetic nervous system activity, which may cause an over-expenditure of energy and a maladaptive adjustment to subsequent stressors. In support of this theory, heart rate and blood pressure, signs of

sympathetic nervous system activity, were observed to be significantly higher in veterans with PTSD when compared to a matched group of asymptomatic veterans (review by Shalev & Rogel-Fuchs, 1993).

The theory that impairments in the HPA axis have a negative effect on physiological sexual arousal in women with PTSD was supported by a study that found that increased sympathetic activity facilitated physiological sexual arousal in non-abused women but not in women with a history of CSA (Rellini & Meston, 2006). Higher levels of sympathetic nervous system activity induced by exercise did not enhance physiological sexual arousal in CSA survivors and were associated with more negative affect in CSA survivors than in controls. A potential interpretation of these findings is that an impairment of the HPA axis is associated with an overactivity of the sympathetic nervous system, and this, in turn, negatively impacts physiological sexual arousal. It is feasible that during exposure to an erotic stimulus, women with a history of CSA may have an automatic stress reaction which activates the HPA axis. This stress response may be activated automatically even in the presence of non-threatening situation. Thus, while the woman's body responds as in the presence of a negative stressor, her higher brain may interpret the information as pleasant, and this may be at the basis of a disynchrony of physiological and subjective sexual arousal. Levels of cortisol collected during exposure to an erotic video may be able to indicate the activation of the stress response during exposure to an erotic stimulus.

1.8. The Present Study

The literature indicates that women with a history of CSA report a significantly higher rate of sexual dysfunction as compared to women with no history of CSA. The need to develop treatments for sexual dysfunction in women with a history of CSA

warrants a thorough investigation of the physiological and subjective sexual responses and their potential mechanisms. Studies on trauma survivors point at an array of potential psychological and biological consequences of CSA that could be involved with impairments in the subjective and physiological sexual response of CSA survivors. To date, no studies have investigated the differences in physiological and subjective sexual responses in women with and without a history of CSA. Additionally, no study has investigated the potential mechanisms involved in the development and maintenance of sexual arousal dysfunction in CSA survivors. This dissertation aims to add to the current literature by investigating differences in the physiological and subjective sexual responses between adult women with and without a history of CSA. A second aim is to assess whether differences in the sexual responses as measured in the laboratory explain the higher incidence of sexual disorders in CSA survivors. Finally, through the testing of factors that have been linked to CSA by theoretical models and by empirical studies, the present dissertation aims to explore the mechanisms involved in the impairments in physiological and subjective sexual responses of adult CSA survivors. The mechanisms explored in this dissertation include posttraumatic stress disorder, interpersonal difficulties, dissociation, eating disorders, alcohol and drug abuse, body esteem, sexual self-schemas, and the stress response. I expect the findings to guide the development of future treatments aimed at improving the sexual health of CSA survivors.

CHAPTER 2: Methods

2.1. Study 1: The Relationship between Physiological and Subjective Sexual Arousal in Women With and Without a History of CSA

2.1.1. Experimental Design

Study 1 was a mixed model design with 2 between-participants variables (CSA vs. NSA) and two repeated measures variables (physiological and subjective sexual arousal). The outcome variables included physiological sexual arousal (VPA), subjective sexual arousal (SSA) and the relationship between physiological and subjective sexual arousal (VPA/SSA). The first aim was to compare the sexual responses (i.e., VPA, SSA, and VPA/SSA) between women with and without a history of CSA. A second objective of the study was to compare the two groups (CSA and NSA) on the relationship between sexual functioning and the three outcome variables (i.e., VPA, SSA, and VPA/SSA). Women with and without a history of CSA were invited to a one-hour visit that was conducted at the Female Sexual Psychophysiology Laboratory (see Appendix E for the time line of Study 1). During this visit, participants were exposed to a neutral (i.e., a travel video) and an erotic video sequence throughout which their physiological and subjective sexual arousal was assessed continuously with a vaginal photoplethysmograph and the Arousometer (see appendix A). The Arousometer is a device developed by the Female Sexual Psychophysiology Laboratory for the measure of continuous subjective sexual arousal (Rellini, et al., 2005). Additionally, participants were asked to complete

self-reported questionnaires, and were administered structured interviews for the assessment of sexual functioning and current psychological distress (for a schedule of measures used in Study 1 see Appendix F).

2.1.2. Participants

Women with a history of CSA and healthy women with no history of abuse were recruited from the community through advertisements in a local newspaper and fliers posted in laundromats, local stores and services, and public bathrooms. A special effort was made to collect an ethnically diverse sample that reflected the ethnic and racial subdivision of Austin, Texas (10% Black, 4.7% Asian, and 30.5% of people who consider themselves Hispanic, Latino, or otherwise of Spanish culture or origin). The definition of CSA adopted in this study was the one proposed by Finkelhor et al. (1989). As per this definition, a few questions were asked during a phone screening to identify women who fell into the category of CSA survivors and women who had never been sexually abused. The following eligibility criteria were met by all women in the study: age between 25 and 35, fluent in English, currently sexually active with a partner or partners. Inclusion criteria for the CSA group comprised reports of a sexual encounter where touching or penetration of genitals happened before age 16 with someone at least 5 years older. The exclusion criteria for all groups included having experienced a traumatic event in the previous three months, being currently involved in an abusive relationship, currently taking medications known to affect cardiovascular function (e.g., beta blockers), and a diagnosis of psychotic disorder in the past 6 months. If participants were

receiving medication known to affect sexual function (e.g., antidepressants), they were accepted in the study if they reported using the same medication type and dose for the prior 3 months. Women in the no CSA group did not qualify if they reported any sexual encounter before the age of 16 with someone 5 years their older, or if they had ever had any sexual activity against their will. Also, participants in this group did not qualify if they reported a history of physical abuse or neglect during their childhood.

Justification for Subject Selection Criteria

Only pre-menopausal women between 25 and 35 years of age were included in the study in an attempt to increase sample homogeneity since age can impact amount of sexual experience. Also, the upper limit of age was set at 35 because I was interested in studying sexual arousal dysfunction associated with a history of CSA rather than sexual dysfunction associated with medical and clinical conditions linked with age. Women were required to be fluent in English because many of the measures (e.g., female sexual functioning index) were validated on English speaking participants only. Because a primary outcome measure was sexual functioning, which is assessed with questionnaires developed for women in relationships, participants were required to be sexually active with a partner or partners at the time of the study. Given that the focus of the study was to investigate the effects of early sexual abuse experiences on later adult sexual function, women were excluded from participation if the sexual abuse occurred in the previous two years, or if they were currently involved in an abusive intimate relationship.

Women on antidepressants or other medications that impact sexual functioning were accepted in the study as long as their medication had been stabilized for at least 3 months. This condition was chosen to help control for potential changes in sexual function attributable to antidepressant medication that would confound interpretation of the mechanisms of sexual dysfnction investigated in this study. The 3-month time frame was chosen based on research suggesting sexual side effects secondary to antidepressants are apparent within this time period (e.g., Meston & Gorzalka, 1992).

2.1.3. Equipment and Measures

2.1.3.1. Manipulations: Neutral and Erotic Videos

The word "RELAX" appeared on a TV screen for 1 minute before a neutral video (4 min) was presented to the participants. It was followed by 10 minutes of a sexual video. The video was selected from the video library available from the Female Sexual Psychophysiology Laboratory. All videos in this library have been standardized in terms of length of different types of sexual scenes (i.e., foreplay, oral sex and vaginal intercourse), and scenes depicting violence had been edited out. These clips were selected from sexual videos produced and directed by women because past studies indicated that these videos are more successful at producing both physiological and subjective sexual responses in women (Laan, Everaerd, van Bellen, & Hanewald, 1994). Past studies that used these videos with women with a history of CSA found a significant increase in both

physiological and continuous subjective sexual arousal in all participants (Rellini & Meston, 2006).

2.1.3.2. Laboratory Measures

2.1.3.2.1. Physiological Sexual Arousal (VPA)

A vaginal photoplethysmograph (see Appendix A) was used to assess vaginal response to the sexual videos. A data acquisition unit Model MP100WS (BIOPAC System, Inc.) and a software program, ACQKnowledge version 3.7.3 (BIOPAC Systems, Inc., Santa Barbara, CA), was used for the transformation of analog/digital data. The vaginal pulse amplitude (VPA) signal was sampled 80 times per second and the amplitude of each pulse wave was recorded in millivolts (mV).

2.1.3.2.2. Continuous Subjective Sexual Arousal (SSA)

Continuous subjective sexual arousal was measured using the Arousometer (see Appendix A), which consists of a computer optical mouse (Intellimouse by Microsoft®) mounted on a wooden track divided into 10 equally spaced intervals, from "1" to "10". Participants were instructed that "1" is "neutral," and "2" to "10" reflect increasingly higher levels of feeling "sexually turned on." Participants were told, "while the vaginal photoplethysmograph detects the way your body responds to the erotic stimuli, through the Arousometer you will indicate your subjective experience of how 'turned on' or sexually aroused you feel." At each numeric interval that the computer mouse passed, participants felt a slight resistance on the mouse indicating that they were changing from

one numeric value to another. The resistance provided by the arousometer allowed participants to monitor the level of arousal they indicated without having to focus their attention away from the television screen.

The arousometer was connected to a pointer on a computer in the adjacent experimenter's room. A software program written in MatLab detected the position of the pointer with respect to the *y* axis of the computer's monitor every 0.5 seconds. A score of "10" on the arousometer corresponded to the highest point on the screen, and "1" corresponded to the middle of the screen. Units of movement in the arousometer were calculated in percentages (0% = 1 and 100% = 10).

2.1.3.2.3. Likert Subjective Sexual Arousal

Given that the majority of studies on women's sexual response have used self-reported Likert scales completed at the end of the videos to assess subjective sexual arousal, a similar measure was administered in this study. The Film Scale by Heiman and Rowland (1983) is a 41-question scale that has been subdivided into 4 subscales: subjective experience of physiological sexual arousal, subjective experience of mental sexual arousal, negative affect, and positive affect. Items were rated on a 7-point Likert scale indicating "not at all" to "intensely."

2.1.3.3. Measures of Psychological Distress:

Clinician Administered PTSD Scale (CAPS; Blake et al., 1990)

A trained interviewer administered the CAPS, a widely published standardized interview based on the *DSM-IV-TR* (2000) criteria for PTSD. This interview has shown strong test–retest reliability, appropriate internal consistency for the total score (Blake et al., 1990) and strong convergent validity with the Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1998), the MMPI-2 Keane's PTSD subscale (Lyons & Keane, 1992), and the Standardized Clinical Interview, DSM-III (King, Leskin, King, & Weathers, 1998). As recommended by Blake et al., the F1/I2 scoring rule was adopted to subdivide participants in PTSD and no-PTSD groups. According to the F1/I2 rule, the symptom is considered present if the participant scores at least "1" for frequency (once or twice in the past month), and at least "2" for intensity (moderate). The total number of symptoms was used in a regression analysis given the dimensional nature of PTSD. In Study 1 the inter-item correlations were Cronbach's $\alpha = 0.83$, 0.82, and 0.76 for the frequency dimension of items in criteria B, C, and D, respectively, and Cronbach's $\alpha =$ 0.85, 0.84, and 0.76 for the intensity dimension of criteria B, C, and D, respectively. In Study 2 the inter-item correlations were Cronbach's $\alpha = 0.83$, 0.72, and 0.66 for the frequency dimension of criteria B, C, and D respectively, and Cronbach's $\alpha = 0.84$, 0.71, and 0.71 for the intensity dimension of criteria B, C, and D respectively.

2.1.3.4. Childhood Sexual Abuse Measures:

Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998*)*

The CTQ is a 60-item questionnaire that was used to measure history of childhood physical, sexual, and emotional abuse and neglect. Internal consistency

estimates were high for each of the four factors (Cronbach's αs = 0.79 - 0.94) and the whole scale (α = 0.95). Test-retest reliabilities were good for the individual factors (0.80 - 0.83) and the whole scale (0.88) (Bernstein & Fink, 1998). Convergent validity has been established using a structured interview (Bernstein et al., 1994). The score on the physical abuse factor was examined as a risk factor in the tests of the major study hypotheses. Scores on the emotional abuse and neglect factors were used for descriptive and exploratory data analyses. In Study 1, the inter-item correlations were Cronbach's α = 0. 09, 0.97, 0.91, and in Study 2 were Cronbach's α = 0.88, 0.94, and 0.83 for the physical abuse, sexual abuse, emotional abuse factors, respectively.

Child Sexual Abuse Measure (adapted from Finkelhor, 1979)

This is a 13-item survey of childhood experiences involving specific sexual activities that are used to measure type of abuse, duration and severity of abuse, and the survivor's relationship to the abuser. Severity of abuse and duration of abuse are continuous variables that were examined as risk factors in the tests of the major study hypotheses. Presence or absence of incest was treated as a dichotomous variable (scores "0" and "1" respectively) and was examined as a risk factor. In addition, women with a history of CSA were asked to identify their age at the time of their first abuse and last abuse experiences. Age at first abuse incident and length of time since last abuse incident were examined as risk factors in the major data analyses.

2.1.3.5. Sexual Functioning:

Female Sexual Functioning Index (FSFI; Rosen et al., 2000)

To assess levels of sexual functioning, participants completed the FSFI (Rosen et al., 2000). The FSFI is composed of 19 items divided into six main factors: desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items), and pain (3 items). Each subscale has been tested to reflect internal consistency within an acceptable range (Cronbach's α = 0.89 - 0.97). Inter-item reliability was within the acceptable range for sexually functional women (Cronbach's α = 0.82 - 0.92). Test-retest reliabilities were assessed using a four-week interval ranged between Pearson's r = 0.79 – 0.86 (Rosen et al., 2000). Divergent validity has been established using the Locke-Wallace Marital Adjustment Scale (Pearson's r = .53 for women with female sexual arousal dysfunction, Pearson's r = .22 for sexually functional women).

The FSFI has been shown to reliably discriminate women with *DSM-IV-TR* (APA, 2000) diagnosed Female Sexual Arousal Disorder and control patients (Rosen et al., 2000), and women with *DSM-IV-TR* (APA) diagnosed Hypoactive Sexual Desire Disorder and/or Female Orgasmic Disorder and healthy controls (Meston, 2003b) on each of the six domains and the full scale score. Clinical range cut-off scores on the FSFI have been recently reported (Wiegel, Meston & Rosen, 2005). The FSFI total score was used as one of the five dependent variables in the main data analysis strategy. FSFI subscale scores were used for descriptive and exploratory data analyses. The inter-item correlations were Cronbach's α = 0.65, 0.89, 0.85, 0.93, 0.94, and 0.93 in Study 1, and

0.81, 0.85, 0.86, 0.86, 0.87, 0.90, and 0.91 in Study 2, for the desire, arousal, lubrication, orgasm, satisfaction, pain, and full scale domains, respectively.

Sexual Satisfaction Scale – Women (SSS-W; Meston & Trapnell, 2004)

Sexual satisfaction was evaluated using the SSS-W, which is a 30-item questionnaire that assesses five separate domains of sexual satisfaction supported by factor analysis: ease and comfort discussing sexual and emotional issues (Communication), compatibility between partners in terms of sexual beliefs, preferences, desires, and attraction (Compatibility), contentment with emotional and sexual aspects of the relationship (Contentment), personal distress concerning sexual problems (Personal Distress), and distress regarding the impact of their sexual problems on their partners and relationships at large (Relational Distress). The SSS-W domains had shown acceptable internal consistency (Cronbach's $\alpha \geq .74$) and test-retest reliability ($r = .58$-$.79$). The SSS-W reliably differentiated between women with and without sexual dysfunction on each of the domain and total scores (Meston & Trapnell, 2004). The SSS-W total score was used as one of the five dependent variables in the main data analysis strategy. Subscale scores were used for exploratory data analyses. The inter-item correlations were Cronbach's $\alpha = 0.937$, 0.794, 0.879, 0.882, and 0.90 in Study 1, and 0.84, 0.75, 0.89, 0.88, and 0.89 for Contentment, Communication, Compatibility, Relational Distress and Personal Distress factors, respectively.

2.1.4. Procedure

After a brief standardized phone interview for the assessment of inclusion and exclusion criteria, participants were invited for an individual visit held at the Female Sexual Psychophysiology Laboratory (for a timeline of Study 1, see Appendix E). After reading and signing the consent form and the limits of confidentiality, a female experimenter explained how to insert and remove the vaginal photoplethysmograph and how to use the arousometer. Participants were left alone in a private room that was internally locked. After resting comfortably for 10 minutes on a recliner chair the researcher informed the participant via an intercom when the video sequence was ready to start. The video sequence was composed of 1 min of the word "RELAX", 4 min of a non sexual video, and 10 min of an sexual video. Throughout the video sequence, participants were asked to monitor their subjective levels of sexual arousal (SSA) and indicate any change by moving the Arousometer. At the end of the sexual video, the participant completed a questionnaire to indicate her level of sexual arousal and affect during exposure to the sexual video. Then, the participant completed a series of self-report questionnaires on sexual functioning and childhood trauma (for a schedule of measures used in Study 1 see Appendix F). Finally, I administered the CAPS interview. At the end of the study, each participant was compensated $50.00 and thoroughly debriefed. A short assessment was conducted by the researcher to ensure participants were not experiencing negative affect because of the interviews and/or other aspects of

the study. All participants were given a list of therapists in the community that adopt a sliding scale for payment. Suicidal assessment was conducted by the researcher in case a participant revealed suicidal ideations during the interview.

2.2. Study 2: Predictors of the Relationship between Physiological and Subjective Sexual Arousal in Women with a History of CSA

2.2.1. Experimental Design

The second study was conducted to assess potential predictors of the relationship between physiological and subjective sexual arousal in women with a history of CSA. The nine sets of potential predictors of the relationship between physiological and subjective sexual arousal were selected from the information available in the literature on potential mechanisms behind the sexual functioning of women with a history of CSA. The predictors included dissociation during sexual activities, eating disorders, alcohol abuse, body esteem, sexual self-schemas, PTSD severity, pursuing and distancing patterns, and sexual attitudes. A second aim of the study was to investigate cortisol levels during exposure to erotic videos and the psychological problems of CSA survivors.

2.2.2. Equipment and Measures

In addition to those measures used for Study 1, a series of questionnaires and physiological measures were adopted to assess the predictors of the physiological/ subjective sexual arousal relationship.

2.2.2.1. Dissociation:

Clinician Administered Dissociative States Scale (CADSS; Bremner, Kystal, Putnam, Southwick, Marmar, Charney, & Mazure, 1998).

The CADSS is a 27-item clinician administered questionnaire designed to assess dissociative symptomatology with three subscales (amnesia, depersonalization, and derealization) and was developed following a review of literature regarding dissociative symptomatology. Each item is a question describing experiences that might occur in a dissociative state and is rated on a "0" (not at all) to "4" (extremely) Likert scale. The first part of the CADSS (19 items) is a set of questions administered to the patient (e.g., "Do things seem to be moving in slow motion?"), and the second part (8 items) is a set of questions which are rated by the observer (e.g., "Did the subject seem eerie or strange, or in some other way give you an uncomfortable feeling?"). Only the first part of the questionnaire was assigned to the participant in reference to how she felt during the exposure to the video and how she normally felt during a sexual activity with a partner. Interrater reliability assessed by the original article was found to be good for the first part of the questionnaire (r = .92-.99) and internal consistency for all items was adequate (α = .94) (Bremner et al., 1998). Total scores on the CADSS were correlated significantly with the Dissociative Experiences Scale (Bernstein & Putnam, 1986; r = .48, p < .001) and the Structured Clinical Interview DSM-III-R – Dissociative Disorders (Steinberg, Rounsaville, & Cicchetti, 1990; r = .42, p < .005). The CADSS also successfully discriminated between people with PTSD and people with schizophrenia, affective disorders, healthy controls, and Vietnam combat veterans without PTSD. The average

score for patients with PTSD and comorbid dissociative disorder was 19.3, which was significantly higher than the score of patients with PTSD and no dissociation (M = 14.8). In Study 2, the inter-item correlations were Cronbach's α = 0.74, 0.78, and 0.85 for the amnesia, depersonalization, and derealization factors respectively.

2.2.2.2. Eating Disorders:

Bulimic Automatic Thoughts Test (BATT; Franko & Zuroff, 1992)

The BATT is a 20-item self-report questionnaire designed to measure bulimic cognitions and was derived from food journals of bulimics in treatment and from suggestions made by Garner and Bemis (1982) concerning cognitive distortions devised by Beck (1976). Each item is thought to be associated with bulimia (e.g., "I'm special if I'm at the 'right' weight") and is rated on a "1" (not at all) to "5" (all the time) Likert scale of frequency. The BATT was validated on four groups of participants (64 bulimic outpatients, 20 depressed college students, 20 non-binging obese patients participating in a low calorie diet program, and 20 normative college students). Split-half reliability was found to be good (α = .95, p < .001), and item to total test score correlation had a mean Pearsons' r of .77. Internal consistency was found to be adequate for all the groups with Cronbach's α ranging from .80 (controls) to .91 (bulimics) (Franko & Zuroff, 1982). The BATT showed good predictive validity with a significant drop in scores for bulimics pre- (M = 63.6) and post- (47.3) treatment. Also, scores on the BATT correlated significantly with the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the bulimia subscale on the Eating Disorder Inventory (Garner, Olmstead, & Polivy,

1983), and the Bulimia Test (Smith & Thelen, 1984). In Study 2 the inter-item correlation was Cronbach's $\alpha = 0.92$ for the BATT total score.

Eating Attitudes Test Short Version (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982)

The EAT-26 is a 26-item self-report questionnaire designed to identify patients with serious eating concerns. The EAT-26 has three factors (dieting, bulimia and food preoccupation, and oral control) and was derived from the Eating Attitudes Test (Garner & Garfinkel, 1979), which has been found to be a psychometrically sound scale for eating disorders. Each item is a behavior (e.g., "eat diet foods") or attitude (e.g., "feel that food controls my life") typical of anorectics and is rated on a "1" (always) to "6" (never) Likert scale of frequency. With a cut-off score of 20, the EAT-26 was able to correctly distinguish 83.6% of the cases of anorexia from normative participants, and was found to be highly correlated with the EAT-40 ($r = .98$). In Study 1 the inter-item correlation was (Cronbach's $\alpha = 0.849$) for the EAT total score. In Study 2 the inter-item correlation was (Cronbach's $\alpha = 0.842$) for the EAT total score.

2.2.2.3. Alcohol Use:

Alcohol Use Disorder Identification Test (AUDIT; Sauders, Aasland, Babor, de la Fuente, & Grant, 1993)

The AUDIT is a scale composed of 10 items selected from an original pool of 150 items. Only items that showed an adequate interscale reliability, significant correlation with various measure of alcohol intake, and were identified as the most representative

items, were selected for the final version of the scale. The scale was standardized on a sample of 1888 male participants recruited from European and American countries. Cut off points of 8 and 10 computed with the ROC analysis were identified as the most sensitive for hazardous alcohol consumption, abnormal drinking, and alcohol dependence. The scale also has shown an excellent ability to discriminate between alcoholics and non-drinkers. In Study 2, the inter-item correlation was Cronbach's α = 0.85 for the total AUDIT score.

2.2.2.4. Intimacy:

Pursuing-Distancing Scale (P-D; Bernstein, Santelli, Alter-Reid, & Androsiglio, 1985)

The P-D is an 80-item self-report questionnaire designed to measure the degree of preferred interpersonal contact in regards to pursuit and distancing with 6 domains including cognitive style, emotional style, social style, communicative style, sensation seeking, and withholding-expressing tendency (anality). Each item describes a pursuing or distancing behavior and is answered with a "Yes" or a "No." Internal consistency for item to total score was found to have a mean point-biserial correlation of .31, and internal consistency for item to domain was found to have a mean point-biserial correlation of .46, suggesting that pursuing and distancing constructs are multidimensional (Bernstein et al., 1985). Convergent validity was evidenced with a significant correlation between marital status and distancing scores. In Study 2, the inter-item correlations were

Cronbach's α = 0.81 for the total pursuing score and Cronbach's α = 0.78 for the total distancing score.

2.2.2.5. Body Esteem:

Body Esteem Scale (BES; Franzoi & Shields, 1984)

The BES is a 35-item self-report questionnaire based on the Body-Cathexis Scale (Secord & Jourard, 1953) and designed to measure a person's esteem of his/her body. Each item on the BES describes an aspect of sexual attractiveness, weight concern, or physical condition and is rated on a "1" (strong negative feelings) to "5" (strong positive feelings) bipolar Likert scale. Internal consistency was high for both men and women on all three aspects with alpha coefficients ranging from .78 to .87 (Franzoi & Shields, 1984). When compared to Rosenberg's Self-Esteem Scale (Rosenberg, 1965), significant correlations (r = .32 - .51) were found for both men and women on all three aspects except for women's weight concern. There were significant differences in mean scores on the Female Weight Concern aspect when compared with anorexic (M = 19.5) and non-anorexic (M = 29.2) women (Franzoi & Shields). In Study 2, the inter-item correlations were Cronbach's α = 0.81, 0.91, and 0.90 for sexual attractiveness, weight concern, and physical condition items respectively.

2.2.2.6. Sexual Attitude:

Sexual Attitude Scale (SAS; Hudson, Murphy, & Nurius, 1983)

The SAS is a 25-item questionnaire designed to measure liberal and conservative attitudes towards sexual expression, and each item is rated on a "1" (strongly disagree) to

"5" (strongly agree) Likert scale. Good internal consistency was evidenced with an α coefficient of .92 found in multiethnic samples (Murphy, Hudson, & Cheung, 1980). Based upon case information, the SAS successfully discriminated between those with liberal sexual attitudes (M = 24.65) and those with conservative sexual attitudes (M = 51.08) with a point-biserial correlation of .73 suggesting excellent discriminant validity (Hudson et al., 1983). Scores on the SAS were found positively correlated with age (r = .41) and negatively correlated with education (r = -.38) suggesting adequate construct validity (Hudson et al.). In Study 2 the inter-item correlation was Cronbach's $\alpha = 0.92$ for the SAS total score.

2.2.2.7. Sexual Schema:

Sexual Self Schema Scale. (SSSS; Andersen & Cyranowski, 1994)

The Sexual Self-Schema Scale (Andersen & Cyranowski, 1994) was used as a measure of one's perception of the self as a sexual being. This scale consisted of 50 trait-adjectives (26 scored and 24 fillers) participants rated on a scale from "0" (not at all descriptive of me) to "6" (very much descriptive of me) the degree to which each word described themselves. The scale is comprised of two positive dimensions (Romantic/Passionate and Open/Direct self views) and one negative dimension (Embarrassment/Conservatism). Contributing to the Romantic/Passionate dimension are ten adjectives: romantic, passionate, unromantic, warm, loving, feeling, sympathetic, arousable, stimulating, and revealing. The Open/Direct dimension is comprised of the following nine adjectives: direct, straightforward, frank, outspoken, broad-minded,

experienced, casual, open-minded, and uninhibited; and the Embarrassment/ Conservatism aspect is comprised of seven adjectives: cautious, timid, self-conscious, prudent, embarrassed, conservative, and inexperienced. A total score for the Sexual Self-Schema Scale was calculated by summing the items from the positive factors and subtracting the sum of the items from the negative factor. Andersen and Cyranowski (1994) reported an internal consistency of $\alpha = .82$, and test-retest reliability (2-week interval) of $r = .91$. In Study 2 the inter-item correlations were Cronbach's $\alpha = 0.82$, 0.83, and 0.68 for the Romantic/Passionate, Open/Direct, and the Embarrassment/ Conservatism factors respectively.

CHAPTER 3: Data Analysis

3.1. Correlation Coefficients vs. Regression Coefficients for the Analysis of the VPA/SSA Relationship

The three principal outcome variables for Study 1 and Study 2 were: VPA, SSA and the relationship between VPA and SSA (VPA/SSA). A large number of data points collected on VPA and SSA throughout an experimental manipulation (non sexual video vs. sexual video) allowed for a multidimensional analysis of the data that was approached with two techniques. For the first method, VPA and SSA data were reduced to one point for each individual. For SSA, this process entailed subtracting the average of all the SSA scores collected during the erotic video to the average of the SSA scores during the neutral video. Given that all the women kept the Arousometer at 0.00 during the neutral video, this score corresponded to the average of the SSA data scores during the erotic video. For VPA, data reduction entailed computing VPA averages during 30 consecutive sec of maximum pulse amplitude (peak-to-trough distance) during the erotic and the neutral video and subtracting these two averages, a method known as Max Differences. To assess predictors of the relationship between VPA and SSA each individual was assigned a Pearson's correlation coefficient computed between these two variables.

The second method of data analysis used all data points collected during the neutral and the erotic videos to simultaneously compute within- and between-participants analyses. This methodology uses a statistical analysis known as hierarchical linear modeling (HLM). HLM can be categorized as a multi-level process (for a discussion of HLM, see Bryk, et al., 1996). The intercepts and slopes of linear regressions of the outcome variable predicted by within-participants repeated measures were computed for each participant (Level 1). The slopes and intercepts of Level 1 became the outcome

variables for Level 2 to test between-participants differences. HLM is utilized to analyze repeated measures data (Level 1) nested within-subjects (Level 2; Bryk, Raudenbush, & Congdon, 1996). A major advantage of HLM is that it conducts within–subjects analysis of the subjective/physiological sexual arousal relationship and uses the coefficients that describe this relationship (i.e., slope and intercept) as outcome variables to test differences between participants. Given the potential problem posed by the law of initial value ("The higher the pre-stimulus level the smaller the tendency to rise on function raising stimuli" Wilder, 1958, pp. 200) comparing slopes and intercepts computed on within participants repeated data would be considered a more adequate way to investigate group differences. With this methodology, individual differences in VPA do not pose a threat to the interpretation of the results. Also, HLM does not require the assumption of independence of observations, improves the estimate of effects within-participants units, simultaneously estimates variance and covariance components for within-participants and between-participants levels of analysis, and has lower Type I error rates (Raudenbush & Bryk, 2002). Furthermore, HLM can assess individual differences as predictors of the degree of the relationship. Thus, HLM provides an ideal methodology to investigate predictors of the within-participants VPA/SSA relationship.

The benefits of HLM on this specific data set also include the use of the entire population of data points rather than the reduction of thousands of points to one score. Considering that each individual in this study had a total of 780 points to indicate her physiological (VPA) and subjective (SSA) sexual arousal every 10 sec for the entire exposure to neutral and erotic videos (14 min), HLM was able to preserve the richness of the information collected with this method that is otherwise lost because of the need to reduce the data to one point per individual.

From a theoretical point of view, using both correlation coefficients and HLM analyses to study the VPA/SSA relationship is necessary to address the multidimensionality of this construct. Correlation coefficients allow the investigation of the *synchronicity* of how VPA and SSA measures change in respect to each other during exposure to erotic stimuli. Conversely, the HLM coefficients allow the investigation of the *balance* between the magnitude of changes in VPA with respect to the magnitude of changes in SSA. Based on the assumption that both physiological and subjective responses to erotic stimuli are intrinsic aspects of sexual arousal, it would be expected that a deviation from a relatively balanced response of both subjective and physiological systems may indicate an inhibition of one of these two systems. For example, a strong increase in subjective sexual arousal in the presence of a dim increase in physiological sexual arousal (i.e., higher HLM coefficients for SSA estimated by VPA) may be indicative of an inhibited physiological response. Vice versa, low SSA responses in the presence of high VPA increments (i.e., low HLM coefficients of SSA as estimated by VPA) may be indicative of an inhibited SSA response. This assumption is worthy of exploration if, indeed, the VPA/SSA balance were to show an association with sexual function.

3.2. Data Analyses: Study 1

3. 2.1. Group Differences between CSA and NSA

3.2.1.1. Hypotheses

Based on studies conducted on the sexual response of CSA survivors (e.g., Rellini & Meston, 2006) and on studies that indicate an impairment in the physiology of the sympathetic nervous system of trauma survivors (Yehuda, 2003), I hypothesized a

significantly lower VPA response in CSA survivors as compared to NSA. On the premises that previous studies did not find a difference in subjective sexual arousal reported by women with and without a history of CSA (Rellini & Meston), I did not expect subjective levels of sexual arousal (SSA) to differ between groups. In congruency with a previous study on the VPA/SSA relationship (Rellini & Meston) I expected both the synchronicity (within-participants correlation coefficients) and the balance (HLM coefficients) of the subjective and physiological sexual response of the CSA group to be weaker than the NSA group.

3.2.1.2. Validity Check for the Video Manipulation

The ability of the video to induce physiological and subjective sexual arousal was tested on participants from Study 1. A 2-level HLM model (Appendix H, Equation 1) was used to assess the VPA response (outcome variable) as estimated by VIDEO (neutral = 0; erotic = 1). A similar model was computed for SSA (outcome variable) to assess the effect of the erotic video on the subjective experience of sexual arousal. This procedure was also used to assess the validity of the erotic video used in Study 2.

3.2.1.3. Between-Participants Analyses

The first hypothesis addressed in Study 1 regarded group differences in sexual responses between women with (CSA) and without (NSA) a history of CSA. This hypothesis was first tested with *t*-tests conducted between groups (CSA vs. NSA) on continuous physiological (VPA) and subjective (SSA) sexual responses and on the VPA/SSA correlations coefficients.

3.2.1.4. Multi-Levels Analyses

Given the benefits of conducting within-participants analyses, data were also analyzed using an HLM model for each of the three outcome variables: VPA, SSA, and the VPA/SSA relationship. Equation 1 and Equation 2 provide an example of the models used to test VPA and the VPA/SSA relationship.

$$VPA_{ij} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \quad \text{(Equation 1)}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + u_{1j}$$

$$SSA_{ij} = \beta_{0j} + \beta_{1j}(VPA) + + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij} \quad \text{(Equation 2)}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(CSA)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(CSA)_j + u_{3j}$$

In Equation 1, VIDEO was coded 0 when neutral and 1 when erotic, while in Equation 2 the erotic video was coded 0 and the neutral video was coded 1. This coding allowed the interpretation of $Beta_1$ (Beta = **B**) of Equation 1 as the estimate of the increase in the DV to the erotic video. In this Equation, γ_{10} is the coefficient that estimates DV changes during the erotic video from women in the NSA group, while γ_{11} is the difference between the NSA group and the CSA group in the increase of the DV because of the erotic video. In Equation 2, the $\mathbf{B}_1$ coefficient corresponds to the change in SSA estimated by an increase in 1mV in VPA during the erotic video. The γ_{10} coefficient correspond to changes in SSA given a change in 1 mV change in VPA during the erotic video for the NSA group; while the γ_{11} coefficient is the estimate of the group difference

between CSA and NSA in the degree with which a change in 1 mV in VPA estimates a change in SSA during the erotic video.

3. 2.2. Group Differences Associated with Sexual Function

3.2.2.1. Hypotheses

The driving hypothesis of Study 1 was that, in CSA survivors, sexual dysfunction would be associated with impairments in the VPA, SSA, and the VPA/SSA responses. Although group differences between women with and without a history of CSA can provide important information on the sexual response of CSA survivors, only a relationship between sexual function and the sexual responses tested in the laboratory make these results clinically meaningful. The literature on VPA and female sexual arousal dysfunction has failed to find a significant relationship between physiological and subjective sexual arousal and sexual function (for a review, see Brotto, Basson, & Gorzalka, 2004). Only in one study VPA was found useful in distinguishing women with a sexual dysfunction, but this was only for women with a female sexual arousal dysfunction with genital subtype (Brotto, et al., 2004). The lack of a significant relationship between physiological sexual arousal (VPA) and sexual problems may be an indication that physiological sexual responses are not a relevant component of the sexual difficulties experienced by women. Study 2 hypothesized that this is not true in the case of CSA survivors. Since lower VPA responses were observed in women with a history of CSA than in non-abused women (Rellini & Meston, 2006; Laan & Everaerd, 1995) it is plausible that the physiological sexual response in CSA survivors may play a stronger role in their sexual function. Therefore, it was hypothesized that the sexual function of

CSA survivors would be positively associated with VPA, SSA, and with the VPA/SSA relationship.

Given that the focus of the study was sexual arousal, only the sexual Arousal domain of the FSFI (FSFI_A) was used rather than a general level of sexual function. Additionally, in agreement with the consensus committee for the definition of female sexual dysfunction (Basson et al., 1993), we used a measure of subjective sexual distress as calculated by the Sexual Satisfaction Scale for Women, total score (SSS_W) to capture the individual experience of the impact of the sexual problem in the woman's life.

3.2.2.2. Between-Participants Analyses

A separate 2-step hierarchical, multiple, linear regression was computed for each DV inserting sexual arousal function (FSFI_A) as Step 1 predictor and adding CSA and the interaction between CSA and sexual function (CSAxFSFI_A) in Step 2. A significant adjusted R^2 for Step 1 was interpreted as evidence that sexual function was significantly associated with the DV. A significant increment in adjusted R^2 with Step 2 was considered an indication that CSA and/or the interaction between CSA and sexual function significantly added to the explanation of the variance in the DV provided by Step 1. An analysis of coefficients was used to investigate the potential presence of the interaction effect between CSA and sexual function. In cases where the interaction coefficient was statistically significant a regression between sexual function and the DV was computed separately for CSA and NSA women. The same method was used to test sexual satisfaction, SSS_W.

3.2.2.3. Multi-Level Analyses

The HLM Models used to assess the interaction between CSA and sexual function in the estimate of VPA and SSA (Equation 3) used the same Level 1 predictors indicated in Equation 1. The Level 2 predictors included sexual arousal function (FSFI_A), CSA and the interaction between CSA and sexual function (CSAxFSFI_A). The model used to test the VPA/SSA used VPA, VIDEO and VPAxVIDEO as Level 1 predictors, while the Level 2 predictors included CSA, FSFI_A and CSAxFSFI_A (Equation 4). To test sexual satisfaction, FSFI_A was substituted with SSS_W in each model.

$$
\begin{aligned}
VPA_{ij} &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\
\beta_{0j} &= \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(FSFI\_A)_j + \gamma_{03}(CSAxFSFI\_A)_j + u_{0j} \\
\beta_{1j} &= \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(FSFI\_A)_j + \gamma_{13}(CSAxFSFI\_A)_j + u_{1j}
\end{aligned}
\tag{3}
$$

$$
\begin{aligned}
SSA_{ij} &= \beta_{0j} + \beta_{1j}(VPA) + + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij} \\
\beta_{0j} &= \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(FSFI\_A)_j + \gamma_{03}(CSAxFSFI\_A)_j + u_{0j} \\
\beta_{1j} &= \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(FSFI\_A)_j + \gamma_{13}(CSAxFSFI\_A)_j + u_{1j} \\
\beta_{2j} &= \gamma_{20} + \gamma_{21}(CSA)_j + \gamma_{22}(FSFI\_A)_j + \gamma_{23}(CSAxFSFI\_A)_j + u_{2j} \\
\beta_{3j} &= \gamma_{30} + \gamma_{31}(CSA)_j + \gamma_{32}(FSFI\_A)_j + \gamma_{33}(CSAxFSFI\_A)_j + u_{3j}
\end{aligned}
\tag{4}
$$

3.3. Data Analyses: Study 2

3.3.1. Sexual Abuse Severity and Sexual Responses

Measures of severity of the abuse comprised frequency and types of forced sexual behaviors experienced and were measured with the CTQ. A Pearson's correlation analysis between CTQ factor (Sexual Abuse, Emotional Abuse, and Physical Abuse) with

VPA, SSA and VPA/SSA was tested with linear regressions analyses. Each of the CTQ factors were used in separate simple linear regressions computed for the three outcome variables (i.e., VPA, SSA, and VPA/SSA correlation coefficients).

3.3.2. Predictors for VPA, SSA, and for the Relationship between VPA and SSA

The main goal of Study 2 was to conduct an exploratory analysis of the potential predictors of the sexual response of CSA survivors. The lack of published studies on the physiological and subjective sexual response of CSA survivors as measured in a laboratory setting called for a general exploratory study to provide an initial guidance on the type of variables that may be significantly associated with sexual responses in CSA survivors. A list of nine sets of potential factors involved with the sexual response of CSA survivors was derived from a thorough review of the literature and included: 1) eating problems and body image, 2) comfort with intrapersonal closeness, 3) posttraumatic stress disorder, 4) dissociation, 5) affect before and in response to the erotic videos, 6) sexual-self views, 7) sexual satisfaction, 8) sexual function, and 9) sexual attitudes. The variables that showed the strongest relationship with the outcome variables were used in a subsequent analysis. This approach has been previously used when complex phenomena were hypothesized to be associated with a large number of factors included in the same exploratory model (Bryk & Thum, 1989).

3.3.2.1. Hypotheses

Given the literature on the physiological impairments in sympathetic activity experienced by women with a history of CSA, it was hypothesized that VPA increments

to the erotic video would show an association with posttraumatic stress disorder and dissociation. SSA was hypothesized to be associated with lower negative affect during the exposure to the video based on previous studies conducted on women recruited from the community (Heiman, 1980) and on the evidence of the association between negative affect and sexual words (Meston & Heiman, 2000). The synchronicity and balance of the VPA/SSA relationship was expected to be associated with factors affecting the comfort of a woman to feel in tune with her body, including body image, sexual attitudes, comfort with closeness, and sexual self-schemas.

3.3.2.2. Between-Participants Analyses

At first, a general overview of the relationship between the nine sets of variables and sexual responses (VPA, SSA, and VPA/SSA correlation coefficients) was presented using partial correlation coefficients. The variables that were more strongly associated with the outcome variable in each of the nine sets were used in a composite model analyzed with a multiple linear regression. An attempt was made to identify the best fitting model by eliminating those variables in the composite model that showed the lowest partial correlation with the outcome variable. To assess whether the more conservative model explained a similar portion of the variance than the full model, FΔ scores were presented. Residual and leverage analyses were conducted to test for outliers.

3.3.2.3. Multi-Level Analyses

To identify the predictors that were more strongly associated with the outcome variables, each of the nine sets of variables was included as Level 2 predictors in a

separate model. In cases where a composite score for the set of variables was available and theoretically sound (i.e., sexual satisfaction, posttraumatic stress disorder symptoms, dissociation symptoms, etc.), the total score was used at first and only if it significantly estimated the DV a second model was tested for the different factors. Level 1 predictors changed according to the DV (see Equations 3 and 4), VPA was estimated by VIDEO (erotic = 1, neutral = 0), SSA was estimated by VIDEO (erotic = 1, neutral = 0), and SSA was estimated by VPA, VIDEO (erotic = 0, neutral = 1), and VPAxVIDEO. All the results for these analyses are included in Appendixes I. For the sake of simplicity, only variables that showed a significant association with the outcome variable are presented in the Results section.

3.3.3. Cortisol Levels and the Sexuality of CSA Survivors

The role of cortisol response to erotic videos in the sexuality of CSA survivors was a topic analyzed separately from the nine sets of predictors given that cortisol has been hypothesized to have a complex relationship with a number of variables other than sexual arousal, including posttraumatic stress disorder symptoms, dissociation, and eating disorders. On the premises of studies on the HPA axis and psychiatric diagnoses such as depression and posttraumatic stress disorder, it was hypothesized that higher dissociation and/or posttraumatic stress disorder symptoms would be associated with elevated cortisol levels during exposure to the erotic video. People with higher dissociation and posttraumatic stress disorder were also expected to show an elevated cortisol level after exposure given that pervious studies conducted in the animal model and in humans have shown an over sensitization of the cortisol receptors (for a review, see Yehuda, 2003).

CHAPTER 4: Results

4.1. Study 1: Differences in Sexual Responses Between Women With and Without a History of CSA

4.1.1. Participants

A total of 21 women with no history of sexual abuse (NSA) and 20 women with a history of CSA participated in Study 1. Of the 187 women who called the Female Sexual Psychophysiology Laboratory to inquire about the study, 123 did not qualify for a variety of reasons, including health problems that affected sexuality (18%), taking medications that affect sexuality for less than 3 months (2.4%), no sexual activities in the previous 4 weeks (13.8%), outside the age range (16.2%), lesbian orientation (7.3%), voluntary sexual experiences before the age of 16 with someone at least 5 years older (8.9%), and a history of sexual abuse during adulthood but not during childhood (13.8%). Of the 74 women who qualified, 8 were not interested and 25 scheduled a visit but either cancelled or no showed (10 women in the CSA group and 15 women in the NSA group). Because of technical difficulties, the physiological assessment of one of the participants was not collected, leaving the CSA sample with 19 participants. A woman in the NSA group denied any history of CSA during the phone screening but reported a sexual encounter with a family member 5 years her senior in one of the questionnaires completed during the study, thus her data was excluded from the analyses.

4.1.1.1. Differences between CSA and NSA Groups in Participants Characteristics

Women in the CSA and the NSA groups did not differ significantly in age, number of children, household income, and education (Table 1). Participants' mean age was 29.7 years, *SD* = 5.5. Thirty-one participants (79.5%) had at least some college

education, and 84.6% (n = 33) reported a household income less than $50,000 per year. The majority of the women participating in this study did not have children (n = 23, 59.0%) and although all women identified as heterosexual, 20 (51%) reported having occasional or rare fantasies (or attractions) towards to other women.

Table 1: Description of Demographics for Participants in the CSA and the NSA Groups

	NSA		CSA		
	M	SD	M	SD	t (37)
Age	28.90	4.95	30.53	6.08	-0.92
N. of adults in household	1.75	0.72	2.05	1.18	-0.98
N. of children in household	0.19	0.54	0.69	0.95	-1.83**
	n	%	n	%	L.R.
Education					7.97***
At least some college	20	100.00	14	73.68	
Household Income					3.16
Less than $ 50,000 per year	15	75.00	18	94.74	
Relationship Status					4.23
Single, not dating	2	10.00	2	10.53	
Single, dating	2	10.00	6	31.58	
In a committed relationship	12	60.00	6	31.58	
Married	4	20.00	5	26.32	
Country of Heritage					4.37
USA	8	40.00	11	57.89	
Europe	3	15.00	5	24.31	
Mexico	1	5.00	1	5.26	
Other: India	1	5.00	-	-	
Philippines	1	5.00	-	-	
Holland/Indonesia	1	5.00	-	-	
Not specified	5	25.00	3	15.79	
Ethnicity					5.36
Caucasian	15	75.00	16	84.21	
Hispanic/Latina	3	15.00	4	21.05	
Asian American	3	14.29	0	0.00	
African American	1	4.76	3	15.79	
Native American	0	0.00	1	5.26	
Other (Bolivian)	1	4.76	0	0.00	

Note: Participants were instructed to check all the options that applied for ethnicity; thus the total number does not correspond to the number in the sample.
* $p < .05$, ** $p < .01$, *** $p < .001$

4.1.1.2. Wanted Sexual Experiences before Age 16

To examine group differences in specific types of voluntary sexual behaviors before age 16, sexual behaviors were divided into 5 categories: Non-Invasive (being kissed or hugged in a sexual way, been shown someone's genitals, or showing one's genitals), Sexual Touch (e.g., being fondled, touching of the genitals), Oral Sex (i.e., receiving or giving oral sex), Vaginal Intercourse, and Anal Penetration. A similar percentage of women in the NSA and in the CSA groups reported voluntary sexual behaviors before age 16 (Table 2). Overall there was no statistically significant group difference in the frequency of these behaviors.

Table 2: Description of Wanted Sexual Behaviors before the Age of 16

	People reporting voluntary sexual behaviors		Frequency of the voluntary sexual behaviors	
	NSA	CSA	NSA	CSA
Voluntary Sexual Behavior	n (%)	n (%)	M (SD)	M (SD)
Non-Invasive	10 (50%)	15 (79%)	1.62 (1.78)	2.65 (1.55)
Sexual Touch	13 (65%)	11 (58%)	2.13 (1.73)	2.01 (1.84)
Vaginal Intercourse	8 (40%)	10 (53%)	1.25 (1.74)	1.95 (1.96)
Oral Sex	7 (35%)	9 (47%)	1.15 (1.69)	1.74 (1.92)
Anal Penetration	2 (10%)	3 (16%)	0.15 (0.49)	0.21 (0.54)

Note: Frequency of behaviors was scored as 0 = "never," 1 = "once," 2 = "2 - 4 times," 3 = "5 – 7 times," and 4 = "more than 8 times."

The most frequent voluntary sexual behaviors were Non-Invasive and Sexual Touch (Table 2). For women in the NSA group, Sexual Touch was more frequent than Non-Invasive sexual behaviors, whereas for women in the CSA group, Non-Invasive

sexual behavior was more frequent. However, the CSA and the NSA groups did not differ in overall frequency of Sexual Touch, $LR = 3.45$, $p = .063$, Vaginal Intercourse, $LR = 0.63$, $p = .43$, Oral Sex, $LR = 2.34$, $p = .13$, or Anal Penetration, $LR = 0.29$, $p = .59$. The only group difference between CSA and NSA was a higher incidence of Non-Invasive behaviors among the CSA group, $LR = 4.24$, $p < .05$.

Table 3: Description of the Types of the Unwanted Sexual Behaviors, the Frequency of the Sexual Behaviors and the Relationship with the Perpetrator(s) Reported by Women in the CSA Sample

Unwanted Sexual Behavior	Frequency M (SD)	Relationship with Perpetrator Number of Participants endorsing each category						
		S	A	FR	FP	B	FA	OF
Non-invasive behavior	2.65 (1.54)	-	1	6	1	-	6	9
Sexual touch	2.01 (1.84)	-	2	9	-	1	3	8
Vaginal intercourse	1.95 (1.96)	1	2	2	-	-	-	1
Oral sex	1.74 (1.92)	1	-	4	1	-	3	4
Anal penetration	0.21 (0.54)	1	-	1	1	-	-	1

Note: Frequency refers to how often participants reported the unwanted sexual behavior scored as 1 = "once", 2 = "2 - 4 times," 3 = "5 - 7 times," and 4 = "more than 8 times." Relationship with perpetrator refers to number of participants reporting each category of the perpetrators by type of unwanted sexual behavior. In several instances participants marked more than one perpetrator per sexual behavior category. S = stranger; A = acquaintance; FR = friend; FP = friend of your parents; B = brother; FA = father figure; OF = other family member (i.e., not a sister, father, mother or brother).

4.1.1.3. Sexual Abuse Description

The two most commonly reported unwanted sexual experiences in the CSA group were Non-Invasive behaviors and Sexual Touch (Table 3). Participants reported up to 6

different types of mutually exclusive relationships with the perpetrators indicating that some women were abused by at least 6 individual perpetrators. In this study we did not collect data on the number of perpetrators itself, but it can be safely assumed that the number varied from a minimum of 1 to at least 6 for Sexual Touch, 1 to 2 for Non-Invasive Sexual Behaviors, and 1 to 3 for Oral Sex. Unwanted Vaginal Intercourse was reported with acquaintances or friends in 4 instances, and never with a father figure. Oral Sex and Non-Invasive behaviors were more common when the perpetrator was a family member, a friend, or a father figure. Family Members, a category that excluded parents and siblings, was the most commonly reported relationship. None of the participants indicated that perpetrators were mothers or sisters, although these were possible response choices.

4.1.2. Sexual Function

Overall, women in the CSA group reported statistically lower scores than women in the NSA group in sexual function and, in particular, in the FSFI domain of Arousal, Lubrication and Satisfaction (Table 4). The effect sizes of the differences in the Arousal and Lubrication domains of FSFI showed a large difference between groups, indicating less than 51% of overlap between the two groups on these factors. In comparison with previous data on studies that investigated sexual function, women in the CSA group scored within 1 *SD* from the mean of women diagnosed with sexual dysfunction.

The average full scale FSFI score in the CSA group was slightly above the cut off (26.55) that has been found to reliably discriminate between women with and without diagnoses of sexual dysfunction (Wiegel, et al., 2005), indicating significant problems in sexual function. Of the women in the NSA and the CSA groups, 3 and 4 women,

respectively, scored 2 *SD* below the mean of the Desire domain reported for women with no sexual dysfunction (Wiegel, et al., 2005). A total of 3 and 5 women in the Arousal domain, 0 and 1 in the Lubrication domain, 1 and 4 in the Orgasm domain, 4 and 6 in the Satisfaction domain, and 1 and 1 in the Pain domain scored over 2 *SD* below the mean of women with no sexual dysfunction computed for the respective domains.

Table 4: Description of Group Differences in Levels of Sexual Function (FSFI) and Sexual Satisfaction (SSS_W) for Women in the CSA and the NSA Groups

	NSA		CSA			
	M	SD	M	SD	*t*	Cohen's ***d***
FSFI						
Desire	4.47	1.00	4.17	1.03	0.93	0.30
Arousal	5.16	0.99	4.37	0.83	2.68*	0.86
Lubrication	5.69	0.60	5.02	0.86	2.81**	0.90
Orgasm	5.00	1.03	4.32	1.54	1.64	0.52
Satisfaction	4.68	1.50	3.71	1.38	2.10*	0.67
Pain	5.62	0.94	5.18	1.09	1.36	0.43
Full scale	30.62	4.42	26.59	4.24	2.86**	0.93
SSS_W						
Contentment	21.84	7.99	16.53	6.54	2.24*	0.73
Communication	24.74	4.32	20.79	6.37	2.23*	0.73
Compatibility	24.84	5.61	21.79	6.87	1.50	0.49
Relational distress	26.11	5.03	20.95	7.67	2.45*	0.80
Personal distress	25.47	5.21	20.53	7.79	2.30*	0.75
Total score	123.00	22.78	100.58	27.48	2.74**	0.89

* $p < .01$, ** $p < .01$.

There was a large difference between women in the CSA and the NSA groups in levels of sexual satisfaction (SSS_W) in the Contentment, Communication, Relational

Distress, and Personal Distress factors (Table 4). As illustrated by the Cohen's ***d*** coefficients, there was less than 52% of overlap in the scores of the two groups on these three factors. These between-groups differences may be interpreted as clinically meaningful since the CSA group fell 2 *SD* below the average scores of women with no sexual dysfunction as reported in the SSS_W validation article (Meston & Trapnell, 2005). A total of 6 and 13 women in the NSA and CSA groups, respectively, scored 2 *SD* below the mean of women with no sexual dysfunction in the Contentment factor (Meston & Trapnell, 2005), 4 and 10 women in the Communication Factor, 6 and 9 women in the Compatibility factor, 6 and 11 women in the Relational Distress factor and 5 and 11 women in the Personal Distress factor.

4.1.3. Laboratory Measures of Sexual Response

4.1.3.1. Validity Check for the Video Manipulation

On average, women showed an increase of 40.3% in VPA from the neutral to the erotic video. This corresponded to a difference in 1.75 mV, *SD* = 0.33, from neutral to erotic video. An HLM analysis (Appendix H, Equation 1) using TIME as the sole Level 1 predictor (within-participants) showed that, overall, the physiological sexual response of participants increased significantly during the exposure to the erotic video, $\boldsymbol{B}_1 = 0.002$*; t* = 5.37; $p < .001$. On average, women started with a VPA of 2.88 mV and increased to 4.44 mV by the end of the erotic video compared to an increase in 0.02 mV during the neutral video. The VPA response during the erotic video was comparable to what has been observed in other photoplethysmography studies (see Rellini et al., 2005), indicating

that the video successfully induced physiological sexual arousal in the women who participated in this study.

4.1.3.2. Group Differences in Physiological and the Subjective Sexual Responses to Erotic Stimuli

Physiological Sexual Arousal (VPA)

Independent samples *t*-tests showed no significant differences in physiological sexual arousal (VPA) between women in the NSA and the CSA groups. As illustrated in Table 5, although on average the CSA group showed a weaker increase in VPA from the neutral to the erotic video compared to the NSA group, these differences were not significant. The effect size of this difference was ***d*** = .07, suggesting that these results were not the product of a small sample size but rather are likely to be due to a negligible difference between the two groups.

A 2-level HLM analysis (Appendix H, Equation 1) indicated that NSA women showed an increase of 1.42 mV from the neutral to the erotic video. The VPA response of the CSA group was weaker than the NSA group, showing an increase in 0.97 mV, $t(37) = -1.08$, $p = .286$, from neutral to erotic but this difference was not significant (Table 6).

Subjective Sexual Arousal (SSA)

A *t*-test showed a statistically significant difference, $t(37) = 1.99$, $p < .05$, between average scores of continuous subjective sexual arousal (SSA) of women in the NSA and the CSA groups (Table 5), with an effect size of medium to large magnitude, Cohen's ***d*** = .65, indicating that less than approximately 59.4% of the SSA scores in the two groups overlapped. Women in the CSA group reported overall less SSA during the

erotic video than women in the NSA group. The SSA scores of women in both the CSA and the NSA groups were within 1 *SD* of the mean found for non-sexually dysfunctional women in a previous study (Rellini et al., 2005), meaning that the SSA increase was within the norm.

Change scores (post-erotic video – pre-erotic video) in the self-reported questionnaires (Film Scale) completed by the participants before and after the erotic stimuli did not show significant differences between CSA and NSA in levels of either physiological or subjective sexual response (Table 5). Participants in both groups reported a small increase in perceived Physiological Sexual Arousal (approximately 1 point on a 5-point Likert scale) and a moderate increase in Mental Sexual Arousal (approximately 2 point on a 5 point Likert scale). Positive and negative affect, as measured with the PANAS, did not significantly change pre- to post-video in either the CSA or NSA groups.

Table 5: Group Differences in Physiological and Subjective Sexual Responses between Women in the CSA and the NSA Groups

	NSA		CSA		
Video Responses	M	SD	M	SD	t
VPA (maximum differences)	2.45	2.08	1.76	1.24	1.18
Subjective Sexual Arousal (SSA)	47.63	15.24	36.53	18.58	1.99*
VPA/SSA Correlation Coefficients	0.61	0.33	0.58	0.35	-0.27
Film Scale					
Reported Physiological Arousal	1.62	1.12	1.61	1.01	0.02
Reported Mental Arousal	2.69	1.60	2.75	1.58	-0.12
PANAS Positive Affect (PA)	0.08	0.58	-0.06	0.71	0.63
PANAS Negative Affect (NA)	0.05	0.19	-0.01	0.23	0.88
PANAS PA before erotic video	25.20	7.99	24.89	8.59	0.12
PANAS NA before erotic video	11.75	2.63	13.44	4.05	-1.55

* $p < .05$

Table 6. Multilevel Regression Estimate for VPA as Predicted by VIDEO (Level 1), and by CSA, FSFI_A, and CSAxFSFI_A (Level 2)

	Model 0		Model 1		Model 2		Model 3	
Variable	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.
Fixed effect								
Intercept	3.861***	0.329	3.230***	0.385	3.748*	1.491	3.078**	1.020
CSA	-	-	-0.633	0.454	-1.519	1.943	-1.307	1.292
FSFI_A	-	-	-	-	-0.101	0.298	-	-
CSAxFSFI_A	-	-	-	-	0.185	0.425	-	-
SSS_W	-	-	-	-	-	-	0.002	0.013
CSAxSSS_W	-	-	-	-	-	-	0.007	0.012
VIDEO	-	-	1.425***	0.350	3.314†	1.698	2.100*	1.117
VIDEO x CSA	-	-	-0.387	0.410	-3.320	2.025	-2.469*	1.075
VIDEO x FSFI_A	-	-	-	-	-0.369	0.295	-	-
VIDEO x (CSAxFSFI_A)	-	-	-	-	0.608	0.387	-	-
VIDEO x SSS_W	-	-	-	-	-	-	-0.009	0.012
VIDEO x (CSAxSSS_W)	-	-	-	-	-	-	0.0205*	0.010
Random component								
Participant level								
$Var(r_{ij}) = \sigma^2$	801.64	28.31	0.708	0.842	0.708	0.842	0.708	0.842
Group level								
$Var(u_{0j}) = \tau_{00}$	193.97	13.93	2.026***	1.423	2.140***	1.463	2.128***	1.459
$Var(u_{1j}) = \tau_{11}$	-	-	1.634***	1.278	1.640***	1.281	1.595***	1.263
N. parameters	2		4		4		4	
Model deviance	27,853.38		7591.326		7590.583		7615.957	

Note: Model 0 = Fully Unconditional Model predicting SSA; SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = Vaginal Pulse Amplitude; CSA = Child Sexual Abuse history; FSFI_A= Female Sexual Function Index, Arousal Domain; VIDEO: neutral video = 0, erotic video = 1. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 7. Multilevel Regression Estimate for SSA as Predicted by VIDEO (Level 1), and by CSA, FSFI_A, CSAxFSFI_A, SSS_W, and CSAxSSS_W (Level 2)

	Model 0		Model 1		Model 2		Model 3	
Variable	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.
Fixed effect								
Intercept	3.86***	0.329	0.17	0.16	-0.387	0.36	1.372	2.16
CSA	-	-	1.12	0.73	3.655	2.68	5.696	3.07
FSFI_A	-	-	-	-	0.107	0.10	-	-
CSAxFSFI_A	-	-	-	-	-0.561	0.52	-	-
SSS_W	-	-	-	-	-	-	-0.016	0.03
CSAxSSS_W	-	-	-	-	-	-	-0.046	0.03
VIDEO	-	-	47.71***	3.39	78.302***	11.76	53.483***	13.76
VIDEOxCSA	-	-	-10.06	5.42	-57.353**	19.99	-9.739	20.87
VIDEOxFSFI_A	-	-	-	-	-5.980*	2.51	-	-
VIDEOx(CSAxFSFI_A)	-	-	-	-	9.795*	4.57	-	-
VIDEOxSSS_W	-	-	-	-	-	-	-0.079	0.18
VIDEOx(CSAxSSS_W)	-	-	-	-	-	-	-0.005	0.19
Random Component								
Participant Level								
$Var(r_{ij}) = \sigma^2$	801.64	28.31	429.96	20.74	430.218	20.74	430.050	20.74
Group Level								
$Var(u_{0j}) = \tau_{00}$	193.97	13.93	0.55	0.74	0.695	0.83	0.441	0.66
$Var(u_{1j}) = \tau_{11}$	-	-	283.3***	16.83	276.4***	16.63	298.8***	17.29
N. parameters	2		4		4		4	
Model deviance	27,853.38		26054.015		26036.926		26063.939	

Note. Model 0 = Fully Unconditional Model predicting SSA; SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = Vaginal Pulse Amplitude; CSA = Child Sexual Abuse history; FSFI_A= Female Sexual Function Index, Arousal Domain; VIDEO: neutral video = 0, erotic video = 1. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 8. Multilevel Regression for SSA Estimated by VPA, VIDEO, VPA x VIDEO (Level 1), and by CSA, FSFI_A, and CSAxFSFI_A (Level 2)

	Model 0		Model 1		Model 2		Model 3	
Variable	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.
Fixed effect								
Intercept	3.86***	0.33	-15.34	13.37	73.50	75.01	-45.12	81.67
CSA	-	-	-18.52	20.57	-31.83	25.10	210.56	112.76
FSFI_A	-	-	-	-	-17.26	13.26	5.59	15.54
CSAxFSFI_A	-	-	-	-	-	-	-51.10*	23.39
VPA	-	-	13.77**	4.11	-22.58	26.02	17.64	31.03
VPA x CSA	-	-	9.78	8.29	15.00	10.05	-72.14	44.55
VPA x FSFI_A	-	-	-	-	7.10	4.63	-0.69	5.96
VPA x (CSAxFSFI_A)	-	-	-	-	-	-	18.50†	9.33
VIDEO (V)	-	-	11.48	11.89	-58.95	67.15	45.74	74.32
VIDEO x CSA	-	-	16.64	17.78	27.29	22.70	-191.49†	101.79
VIDEO x FSFI_A	-	-	-	-	13.69	11.87	-6.37	14.11
VIDEO x (CSAxFSFI_A)	-	-	-	-	-	-	46.11*	21.03
VIDEO x VPA	-	-	-12.22***	3.33	16.35	21.60	-17.72	25.79
(VIDEO x VPA) x (CSA)	-	-	-7.83	6.58	-11.98	8.03	64.20	36.97
(VIDEO x VPA) x (FSFI_A)	-	-	-	-	-5.59	3.84	0.97	4.95
(VIDEO x VPA) x (CSAxFSFI_A)	-	-	-	-	-	-	-16.18*	7.73
Random Component								
Participant Level								
$Var(r_{ij}) = \sigma^2$	801.64	28.31	306.00	17.49	306.01	17.49	306.04	17.49
Group Level								
$Var(u_{0j}) = \tau_{00}$	193.97	13.93	3809.53***	61.72	3759.83***	61.32	3375.21	58.10
$Var(u_{1j}) = \tau_{11}$	-	-	632.35***	25.15	623.56***	24.97	577.88	24.04
$Var(u_{0j}) = \tau_{22}$	-	-	2784.15	52.77	2776.18†	52.69	2559.78	50.59
$Var(u_{1j}) = \tau_{33}$	-	-	388.92	19.72	388.26	19.74	377.33	19.43
N. parameters	2		11		11		11	
Model deviance	27,853.38		25,239.31		25,223.49		25,198.35	

Note. Model 0 = Fully Unconditional Model; SSA = Subjective Sexual Arousal; VPA = Vaginal Pulse Amplitude; CSA = Child Sexual Abuse history; FSFI_A = Female Sexual Function Index, Arousal domain; VIDEO: neutral = 1, erotic = 0. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

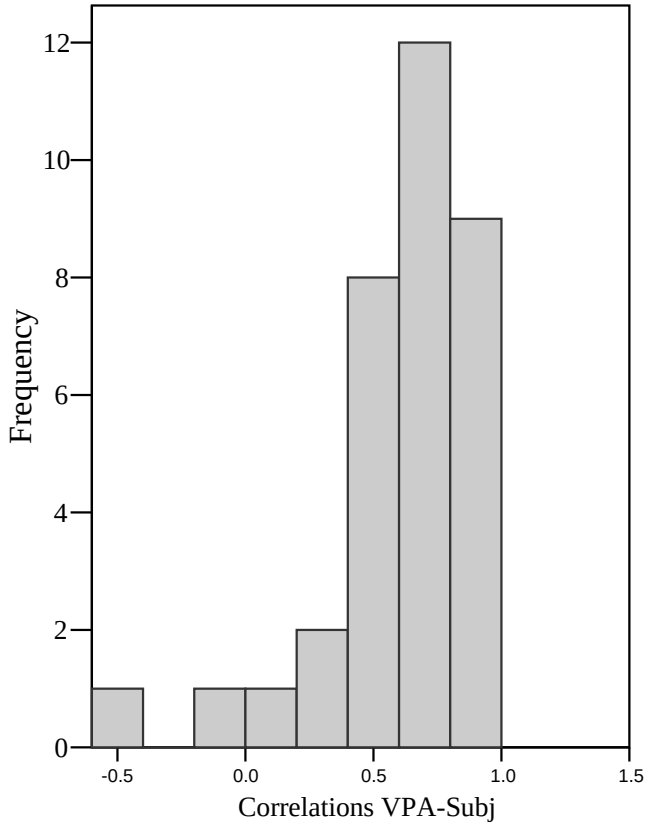
Table 9. Multilevel Regression for SSA Estimated by VPA, VIDEO, VPA x VIDEO (Level 1), and by CSA, SSS_W, and CSAxSSS_W (Level 2)

	Model 0		Model 1		Model 2		Model 3	
Variable	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.	Estimate	s.e.
Fixed effect								
Intercept	3.86***	0.33	-15.34	13.37	-29.99	35.62	-80.57	48.237
CSA	-	-	-18.52	20.57	-18.47	20.91	116.54	80.878
SSS_W	-	-	-	-	0.20	0.46	0.88	0.634
CSA x SSS_W	-	-	-	-	-	-	-1.32	0.796
VPA	-	-	13.77**	4.11	23.84*	9.31	39.79*	16.026
VPA x CSA	-	-	9.78	8.29	9.74	8.31	-34.89	38.314
VPA x SSS_W	-	-	-	-	-0.14	0.14	-0.35	0.228
VPA x (CSAxSSS_W)	-	-	-	-	-	-	0.44	0.399
VIDEO (V)	-	-	11.48	11.89	28.10	33.31	69.38	45.821
VIDEO x CSA	-	-	16.64	17.78	15.76	18.39	-98.30	72.465
VIDEO x SSS_W	-	-	-	-	-0.22	0.42	-0.77	0.597
VIDEO x (CSAxSSS_W)	-	-	-	-	-	-	1.11	0.701
VIDEO x VPA	-	-	-12.22***	3.32	-21.35*	8.22	-34.15*	13.616
(VIDEO x VPA) x (CSA)	-	-	-7.83	6.58	-7.65	6.75	29.86	31.385
(VIDEO x VPA) x (SSS_W)	-	-	-	-	0.12	0.12	0.29	0.193
(VIDEO x VPA) x (CSAxSSS_W)	-	-	-	-	-	-	-0.37	0.326
Random Component								
Participant Level								
$Var(r_{ij}) = \sigma^2$	801.64	28.31	306.00	17.49	306.06	17.49	305.94	17.491
Group Level								
$Var(u_{0j}) = \tau_{00}$	193.97	13.93	3809.53***	61.72	62.93***	3959.94	3615.15***	60.126
$Var(u_{1j}) = \tau_{11}$	-	-	632.35***	25.15	25.52***	651.43	627.33***	25.245
$Var(u_{0j}) = \tau_{22}$	-	-	2784.15	52.77	54.45	2964.36	2875.11	53.620
$Var(u_{1j}) = \tau_{33}$	-	-	388.92	19.72	20.45	418.24	423.89	20.588
N. parameters	2		11		11		11	
Model deviance	27,853.38		25,239.31		25247.51		25251.23	

Note. Model 0 = Fully Unconditional Model predicting SSA; SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = Vaginal Pulse Amplitude; CSA = Child Sexual Abuse history; SSS_W = Sexual Satisfaction Scale for Women; VIDEO: neutral video = 1, erotic video = 0. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

A 2-level HLM model was used to assess group differences (CSA vs. NSA) in changes in SSA with the erotic video (Appendix H, Equation 3). Women in the NSA group, on average, showed an increase in 47.7 SSA units with the erotic video (γ_{10} = 47.71, t (39) = 14.06, $p < .001$), where possible scores ranged from 0 to 100. Women in the CSA group showed an increment in 37.65 SSA units to the erotic video, which was not statistically different from the NSA group, γ_{11} = -10.06, t (39) = -1.858, p = .07.

Figure 1. Frequency Distribution for the VPA/Subjective Sexual Arousal (SSA) Correlations Computed on All Participants



The Relationship between Physiological and Subjective Sexual Responses

First, correlation coefficients were calculated between physiological sexual arousal (VPA) and continuous measures of subjective sexual arousal (SSA) for each participant. The correlation coefficients were compared between women in the CSA and the NSA groups. Only 3 women (2 in the NSA group and 1 in the CSA group) showed non-significant correlations between the two measures of sexual arousal (Figure 1). There were no significant differences in the correlations coefficients between women in the CSA, $M = 0.61$, $SD = 0.33$, and the NSA, $M = 0.58$, $SD = 0.35$, groups, $t(36) = -.265$, $p = .792$ (Table 5).

Group differences in the strength of the relationship between VPA and SSA were then tested with an HLM model (Appendix H, Equation 4) that used SSA as the outcome variable and VPA, VIDEO (erotic video = 0, neutral video = 1), and the relationship between VPA and VIDEO (VPAxVIDEO) as Level 1 predictors (within-participants). The sole Level 2 predictor (between-participants) was CSA (NSA = 0, CSA = 1). The results of this analysis (Table 8, Model 1) showed that, for NSA women, VPA levels significantly predicted SSA levels, $\boldsymbol{B} = 13.77$, $p < .01$, in that an increase in 1 mV in VPA corresponded to an increase in 13.77 SSA units of subjective sexual arousal. This relationship corresponded to a change in 3.9 *SD* of SSA for every change in 0.47 *SD* change in VPA. For women with a history of CSA an increase of 1mV in VPA estimated an increase in 23.55 SSA units and this was not significantly different from women in the NSA group, $\boldsymbol{B} = 9.78$, $p = .247$. This relationship corresponded to a change in 5.4 *SD* of SSA for every change in 0.32 *SD* in VPA. This HLM model showed to significantly reduce the residual variance compared to that of the fully unconditional model for SSA,

$\chi^2(9) = 2{,}614.07$, $p < .001$, indicating that the variables tested in the model accounted for a significant proportion of the variance in SSA.

4.1.3.3. Group Differences in Sexual Responses When Controlling for Sexual Function and Sexual Satisfaction

Physiological Sexual Arousal (VPA)

A 2-step linear regression for VPA (VPA Max Differences) used sexual arousal function (FSFI_A) as predictor in Step 1, and CSA plus the interaction between CSA and FSFI_A (CSAxFSFI_A) as predictors in Step 2 (Table 10). FSFI_A was not significantly associated with VPA, $F(1, 37) = 0.003$, $p = .91$. CSA, FSFI_A and CSAxFSFI_A did not show to significantly predict the variance in VPA, $F(3, 38) = 1.65$, $p = .20$. A similar 2-step linear regression was computed to assess the relationship between sexual satisfaction (SSS_W) and a history of CSA and its effect on VPA. Sexual satisfaction did not show a significant relationship with VPA, $F(1, 37) = 0.062$, $p = .805$. Adding CSA and CSAxSSS_W to the model provided a significant explanation of the variance in VPA. An analysis of the **B** coefficients revealed that women with a history of CSA had significantly lower levels of VPA, $\boldsymbol{B} = -1.67$, $p < .01$, when controlling for SSS_W. Also, the interaction coefficient showed a significant relationship with VPA, $\boldsymbol{B} = 1.39$, $p < .01$, indicating that sexual satisfaction was significantly associated with VPA levels for women in the CSA group but not for the women in the NSA group (Table 10).

The HLM analysis used to estimate VPA changes from neutral to erotic video (Table 6, Model 2 and Model 3) confirmed the results shown by the regression analyses. In the model testing FSFI_A (Appendix I, Equation 4; and Table 6, Model 2), women with no history of sexual abuse (NSA) showed a significant increase in VPA from the

neutral to the erotic videos, $\gamma_{10} = 3.314$, $p < .05$. Levels of FSFI_A did not provide a further explanation of the VPA in NSA women. Women in the CSA group showed less VPA response compared to women in the NSA group, $\gamma_{11} = -3.320$, $p = .11$, but this difference was not statistically significant. Also, for CSA women, greater FSFI_A scores showed a positive relationship with VPA responses, $\gamma_{13} = 0.608$, $p = .12$; however, this relationship was not statistically significant. In the model testing for SSS_W, women in the NSA group showed a significant increase in VPA with the erotic video, $\gamma_{10} = 2.10$, $p < .05$. The VPA responses to the erotic video in women with a history of CSA were significantly weaker compared to women in the NSA group, $\gamma_{11} = -2.47$, $p < .05$. For women in the CSA group, $\gamma_{11} = 0.02$, $p < .05$, but not for women in the NSA group, $\gamma_{11} = -0.009$, $p = .47$, SSS_W was significantly associated with VPA response to the erotic video (Figure 2). This model significantly reduced the deviance of the residuals in the fully unconditional model, $\chi^2(2) = 20237.42$, $p < .05$ (Table 9, Model 0). Approximately 75% of the variance in VPA was located at the between-participants level.

Subjective Sexual Arousal (SSA)

A 2-step linear regression predicting SSA was performed entering sexual arousal function (FSFI_A) as a predictor in Step 1, and CSA and CSAxFSFI_A in step 2 (Table 10). FSFI_A was not associated with SSA, $F(1, 37) = .007$, $p = .933$. Adding CSA and the interaction CSAxFSFI_A did not provided a significant contribution to the model, $F\Delta(2, 35) = 2.89$, $p = .07$. When sexual satisfaction (SSS_W) was used in a similar regression to predict SSA, it appeared that adding CSA and CSAxSSS_W added a significant portion of explained variance to the model, $F\Delta$ (2, 35) = 3.45, $p < .05$.

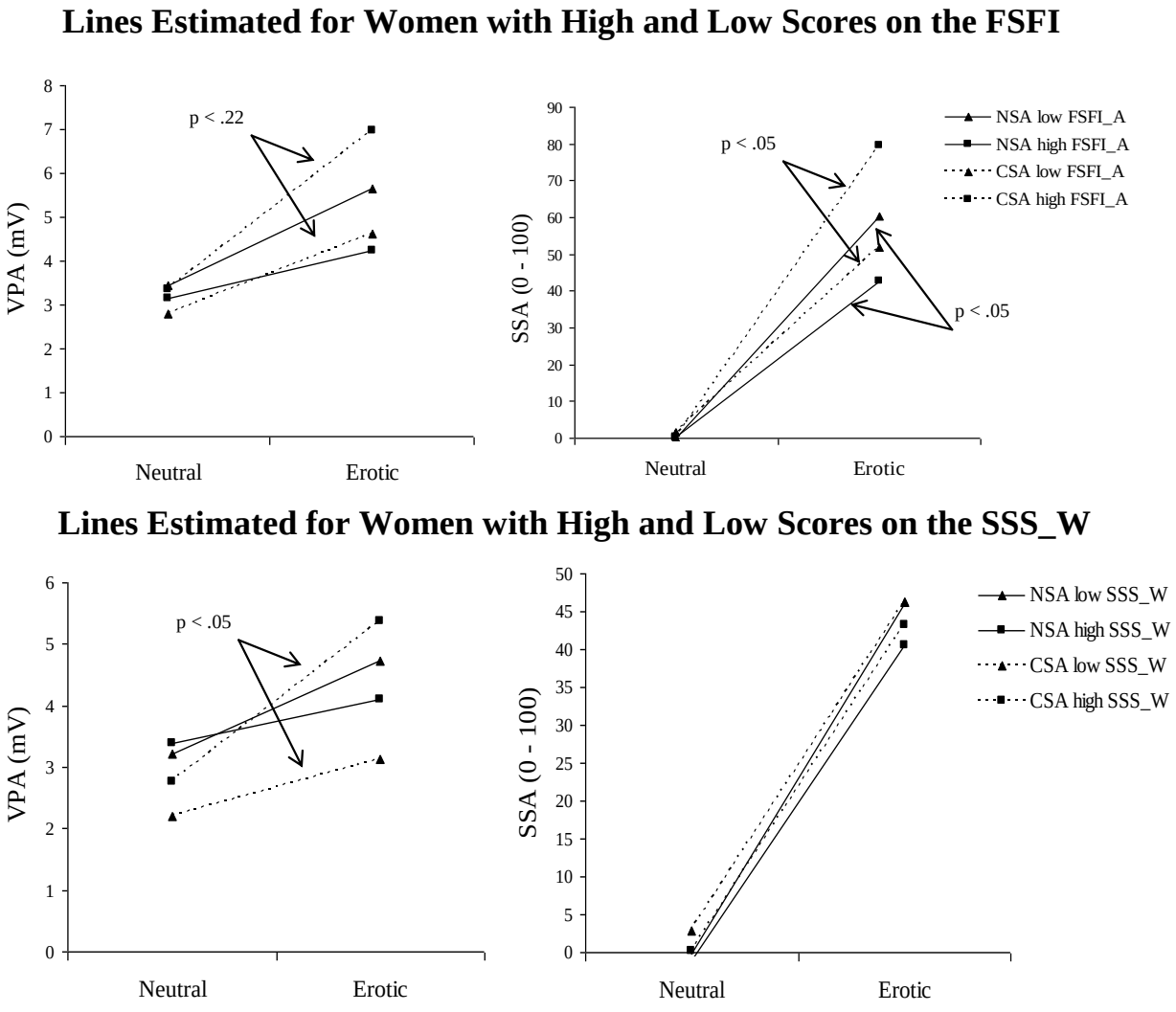
However, the full model that included SSS_W, CSA, and CSAxSSS_W was not significant, F (2, 35) = 2.55, p = .07.

Table 10. Hierarchical Regressions for VPA, SSA, and the VPA/SSA Correlation Coefficients

	Adj R^2	ΔF	B	SEB	**B**
VPA outcome					
Step1	-.030	.003			
FSFI_A			.019	.333	.010
Step2	-.041	.824			
FSFI_A			-.210	.427	-.110
CSA			-2.034	3.676	-.580
CSAxFSFI_A			.262	.772	.344
Step1	-.030	.013			
SSS_W			.001	.012	.020
Step2	.054	2.463			
SSS_W			-.028	.018	-.410
CSA			-5.851	2.859	-1.669*
CSAxSSS_W			.044	.024	1.387*
SSA Outcome					
Step1	-.029	.007			
FSFI_A			-.256	3.011	-.015
Step2	.074	2.892			
FSFI_A			-5.958	3.987	-.339
CSA			-51.547	29.986	-1.489
CSAxFSFI_A			8.434	6.282	1.103
Step1	-.010	.649			
SSS_W			-.089	.110	-.137
Step2	.117	3.449*			
SSS_W			-.334	.170	-.515
CSA			-42.378	26.429	-1.224
CSAxSSS_W			.247	.226	.773
VPA/SSA Outcome					
Step1	.031	2.118			
FSFI_A			.084	.058	.242
Step2	.199	4.558*			
FSFI_A			-.033	.073	-.096
CSA			-1.467	.549	-2.153*
CSAxFSFI_A			.334	.115	2.218**
Step1	-.016	.453			
SSS_W			.001	.002	.115
Step2	.043	2.051			
SSS_W			-.003	.003	-.260
CSA			-.982	.542	-1.441
CSAxSSS_W			.009	.005	1.453

* p < .05, ** p < .01.

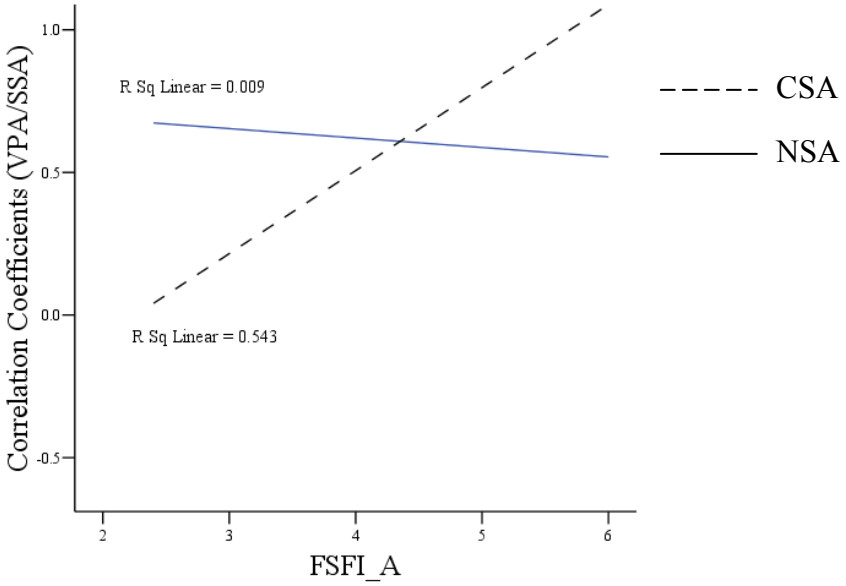
Figure 2. HLM Estimated Values for VPA and SSA During Neutral and Erotic Videos for Women in the CSA and the NSA Groups and for High and Low Scores in Sexual Arousal Functioning (FSFI_A) and Sexual Satisfaction (SSS_W)



Note: Lines for low and high FSFI_A were estimated for participants with scores 2 and 6, respectively. Lines for low and high SSS_W were estimated for participants with scores 91 and 150, respectively. The scores selected corresponded to the minimum and the maximum scores for participants in the study.

The HLM models of SSA estimated by VIDEO (erotic = 1, neutral = 0) when controlling for FSFI_A or SSS_W (Table 7) were similar to the ones used to estimate VPA (Appendix I, Equations 5 and 6). When FSFI_A and CSAxFSFI_A were used as Level 2 predictors (between-participants), women with a history of CSA showed significantly weaker SSA responses to the erotic videos compared to women in the NSA group, γ_{11} = -57.35, p < .01. A history of CSA accounted for a difference in approximately 3.3 *SD* in SSA between groups. Also, for women with a history of CSA, higher levels of sexual arousal function (FSFI_A) were significantly associated with higher SSA responses to the erotic video, γ_{13} = 9.79, p < .05. An increase in 1 *SD* for sexual function was linked to an increase in 0.55 *SD* in SSA. When controlling for SSS_W instead of FSFI_A, the differences between groups followed the same patterns observed for the model using FSFI_A, but these differences were not statistically significant (Figure 2).

Figure 3. Regression Lines for the Correlation Coefficients Between VPA and SSA as Predicted by FSFI_A Computed for CSA and NSA Groups Separately



The Relationship between Physiological and Subjective Sexual Arousal

The results of a 2-step hierarchical linear regression for the VPA/SSA correlation coefficients tested the predictive ability of sexual arousal function scores (FSFI_A), CSA history, and the interaction between FSFI_A and CSA (CSAxFSFI_A). In the first step FSFI_A was the sole predictor, while in step 2 CSA and the interaction CSAxFSFI_A were added to the model (Table 10). The first step (FSFI_A) did not significantly predict the VPA/SSA correlation coefficients, $F(1, 35)= 2.12$, $p = .171$. Adding CSA and CSAxFSFI_A significantly increased the portion of variance in the correlation coefficients explained by the model, $F\Delta\ (2, 33) = 4.56$, $p < .05$. The second step of the model predicted approximately 19% of the variance in the correlation coefficients. An analysis of the **B** coefficients indicated that both CSA, $\boldsymbol{B} = -2.15$, $p < .05$, and the interaction between CSA and FSFI_A, $\boldsymbol{B} = 2.22$, $p < .01$, provided a significant independent contribution to the model. As illustrated in Figure 3, FSFI_A was significantly associated with the VPA/SSA correlation coefficients for women in the CSA but not in the NSA group.

A similar 2-step hierarchical regression was computed to investigate the interaction between CSA and levels of sexual satisfaction (SSS_W) in the prediction of the VPA/SSA correlation coefficients (Table 10). Both step 1, $F(1, 36) = 0.45$, $p = .585$, and step 2, $F(3, 36) = 1.32$, $p = .286$, of the model did not significantly predict the variance in VPA/SSA correlation coefficients.

A two-level HLM model was used to test potential differences between the NSA and the CSA groups in the degree to which physiological and subjective (VPA and SSA) sexual arousal were related (Table 8). In this HLM model (Appendix H, Equation 7), SSA was the outcome variable and VPA, VIDEO (erotic = 0; neutral = 1) and the interaction VPAxVIDEO were used as Level 1 predictors (within-participants). The

Level 2 predictors (between-participants) were CSA, sexual arousal (FSFI_A) and the interaction CSAxFSFI_A in one model (Appendix H, Equation 7), and CSA, sexual satisfaction (SSS_W) and the interaction CSAxSSS_W in the second model (Appendix H, Equation 8). CSA significantly predicted levels of SSA, γ_{03} = -51.10, $p < .05$, indicating that, overall, during the erotic video, the CSA group score 51.10 SSA units less than the NSA group when controlling for the VPA response. There a was trend for an interaction effect on the VPA coefficient between FSFI_A and CSA, γ_{13} = 18.50, $p = .07$, indicating that for women with a history of CSA, greater scores in the FSFI were associated with a greater SSA response when controlling for VPA scores. An analysis of residuals showed that this model significantly improved the explanation of the variance in SSA, $\chi^2(2) = 1661.6$, $p < .001$. Approximately 81% of the variance in SSA in this model was explained by VPA.

The HLM model used to test SSA as estimated by SSS_W, CSA, and CSAxSSS_W (Table 9) indicated that SSA responses to the erotic video were not significantly different between CSA and NSA groups, $\boldsymbol{B}_2$ = -0.005, $p = .979$.

4.2. Study 2: Predictors of Physiological and Subjective Sexual Arousal in CSA Survivors

4.2.1. Participants

A total of 42 women took part in Study 2. Because of technical difficulties, the continuous subjective (SSA) and the physiological (VPA) sexual arousal data for 4 of the participants was not processed. All women were recruited from the same venues used for Study 1 and they all met the inclusion and exclusion criteria for the CSA group in Study

1. The demographic characteristics of these women were very similar to those of the CSA group in Study 1 (Table 11). On average, participants were 30 years of age, with at least some college education (78.6%), and reported a household income less than $50,000 (90.5%). The majority of the women were either in a committed relationship or married (64.3%) and Caucasian (69.0%). The sample was representative of the African American and Asian American population in Texas, with 11.5% and 7.10% of the participants indicating African American and Asian American ethnicity, respectively. The Hispanic population was significantly underrepresented given that only 11.5% of the participants self-identified as Hispanic or Latina and, in Texas, Hispanics have been estimated to account for approximately 30% of the population. The low participation of Hispanic women in this study is surprising considering that a greater effort was made to recruit from the Hispanic community than from the African American or Asian American communities.

Table 11: Description of Demographics for Participants in Study 2 (N = 42)

Demographics Variables	M	SD
Age	30.90	5.73
N. of adults in household	1.86	0.95
N. of children in household	0.86	1.00
	n	%
Education		
At least some college	33	78.6
Household Income		
Less than $50,000 per year	38	90.5
Relationship Status		
Single, not dating	5	11.9
Single, dating	10	23.8
In a committed relationship	17	40.5
Married	10	23.8
Country of Heritage		
USA	20	47.6
Europe	5	11.9
Mexico	1	2.4
Not specified	16	38.1
Ethnicity		
Caucasian	29	69.0
Hispanic/Latina	5	11.9
African American	5	11.9
Asian American	3	7.2

4.2.1.1. Wanted and Unwanted Sexual Experiences

Both Non-Invasive behaviors and Sexual Touch were the most commonly reported voluntary and unwanted sexual behaviors for women who participated in this study. The percentages of voluntary and unwanted sexual experiences were similar meaning that women who reported an unwanted event that included oral sex were likely to report also oral sex in situations where the behavior was voluntary. The frequency of vaginal intercourse was higher when it was a voluntary sexual behavior, $M = 3.24$, than when it was unwanted, $M = 2.67$.

Table 12: Description of Sexual Experiences (Voluntary and Unwanted) Before the Age of 16

Sexual behavior	Voluntary sexual behaviors		Unwanted sexual behaviors	
	People	Frequency of Behaviors	People	Frequency of Behaviors
	n (%)	M (SD)	n (%)	M (SD)
Non-invasive touch	20 (44.4)	3.45 (0.8)	25 (55.6)	3.08 (1.2)
Sexual touch	24 (53.3)	3.08 (1.2)	25 (55.6)	3.24 (1.1)
Vaginal Intercourse	17 (37.8)	3.24 (1.0)	12 (26.7)	2.67 (1.2)
Oral sex	11 (24.4)	3.09 (1.1)	17 (37.8)	3.00 (1.2)
Anal penetration	2 (4.4)	2.33 (1.5)	3 (6.7)	2.5 (2.1)

Note: Frequency of behaviors was scored as 0 = "never," 1 = "once," 2 = "2 - 4 times," 3 = "5 – 7 times," and 4 = "more than 8 times."

4.2.2. Sexual Function

Average levels of sexual function (FSFI) showed by participants in Study 2 were comparable to those of women with no sexual dysfunction. Indeed, women in Study 2 scored within 1 SD from the average of participants recruited for the validation of the FSFI scale (Rosen et al., 2000). Conversely, levels of sexual satisfaction were significantly lower in participants in Study 2 compared to scores showed by women with no sexual dysfunction. Participants in Study 2 scored at least 2 SD below the average of women with no sexual distress.

Table 13. Sexual Function of Participants in Study 2 Compared to the Norms for Women with (FSD) and Without (Controls) Sexual Dysfunction

	CSA		FSD[a]		Controls[a]	
	M	SD	M	SD	M	SD
Sexual Function (FSFI)						
Desire	4.13	1.14	3.10	1.08	4.28	1.12
Arousal	4.41	1.01	3.31	1.14	5.08	1.11
Lubrication	5.02	0.86	3.52	1.66	5.45	1.14
Orgasm	4.38	1.35	2.79	1.31	5.05	1.30
Satisfaction	3.95	1.32	3.83	1.26	5.04	1.19
Pain	5.24	1.08	4.99	1.50	5.51	1.29
Full scale	27.14	4.58	21.59	5.48	30.75	4.80
Sexual Satisfaction (SSS_W)						
Contentment	17.29	5.97	14.60	1.23	21.60	1.27
Communication	22.21	5.73	21.90	1.40	24.80	1.10
Compatibility	21.98	6.73	19.50	1.38	25.20	1.15
Relational distress	20.88	7.35	18.90	1.36	26.50	0.98
Personal distress	20.62	7.44	15.80	1.36	25.00	1.30
Total score	102.98	25.69	88.8	2.06	123.4	2.30

Note: Values for women with female sexual dysfunction (FSD) and with no sexual dysfunction (Controls) were derived from Wiegel, Meston, & Rosen (2005) for the FSFI and from Meston & Trapnell (2005) for the SSS_W.

4.2.3. Validity Check for the Video Manipulation

On average, participants showed an increase of 40.4% in VPA from the neutral to the erotic video, which approximately corresponded to a 2.07mV increase on average (*SD* = 2.7). The VPA change from the maximum 30 sec segment in neutral to the maximum 30sec segment in erotic ranged from 0.20mV to 14.09mV indicating a wide variety of individual differences in VPA responses, a finding congruent with the literature on VPA (e.g., Janssen & Prause, 2005). Baseline levels of VPA collected during the neutral video varied from 1.25mV to 5.79mV, which indicated a more homogenous population of VPA

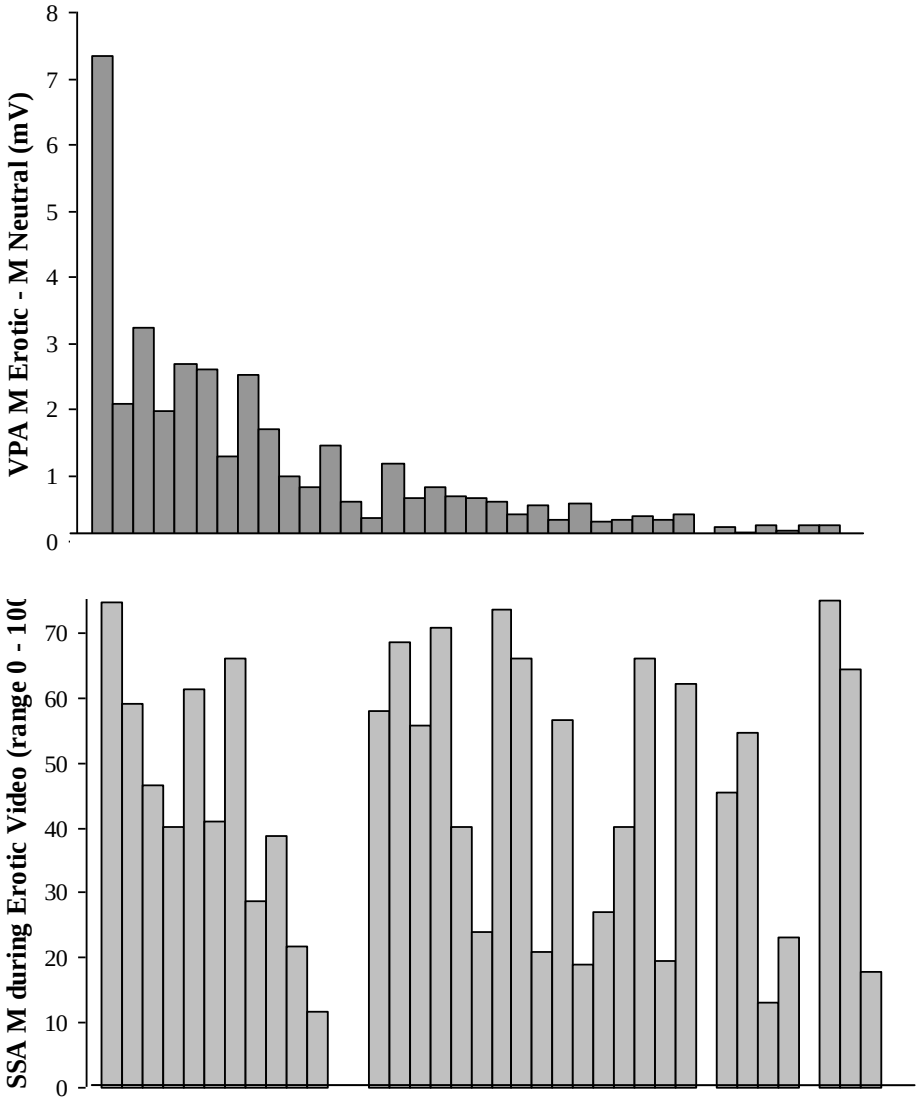
signals as compared to other studies that have observed baseline VPA levels ranging from 1.5mV to 50.0mV (e.g., Rellini et al., 2005). An HLM analysis (Appendix H, Equation 1) of VPA estimated by TIME as Level 1 (within participants) predictors confirmed that women, overall, showed a significant increase in VPA with exposure to the erotic video, $\gamma_{10} = 1.08$, $p < .001$.

Participants showing an average increase in 40.82 SSA units (possible range 0 - 100) during the erotic video, $SD = 23.9$. The maximum response during 30 consecutive sec was on average 76.57 SSA units, $SD = 27.8$. Four participants indicated no increase in subjective sexual arousal while the other participants varied from an average increase of 11.80 to 74.84 SSA units as calculated during the entire duration of the erotic video (Figure 4). A 2-level HLM model (Appendix H, Equation 9) that estimated SSA by VIDEO (neutral = 0; erotic = 1), provided evidence that women overall showed a significant increase in subjective sexual arousal (SSA) due to the erotic video, $\gamma_{10} = 45.38$, $p < .001$.

4.2.4. Replication of Results From Study 1

The results of Study 1 were confirmed in that a significant correlation was observed for CSA survivors between SSS_W and VPA response (SSS_Relational Distress, $r = .384$, $p < .05$; and SSS_Personal Distress $r = 0.382$, $p < .05$. Also, FSFI_A was associated significantly with the VPA/SSA correlation coefficients, $r(38) = .61$, $p < .01$). Moreover, the HLM analyses confirmed that FSFI_A scores were significantly associated with SSA values, $\gamma_{11} = 6.67$, $p < .05$, and SSS_W scores were associated with VPA $\gamma_{11} = 0.02$, $p < .05$.

Figure 4. Frequency Distribution for VPA (Mean Erotic Video – Mean Neutral Video) and for Average Subjective Sexual Arousal (SSA) During the Erotic Video



Note: Graphs are organized such that participants in the top graph correspond to the same column in the lower graph.

Table 14. Correlations between the Predictors Investigated in Study 2

Variables	SAS	FSFI							SSS_W					
		D	A	L	O	S	P	FS	F1	F2	F3	F4	F5	Total
PANAS_Pre-video Positive Affect	-.458*	.282	.265	.213	.168	.038	.117	.258	.336*	.059	.030	.216	.071	.182
PANAS_Pre-video Negative Affect	.288	-.199	-.135	-.233	-.101	-.122	-.080	-.207	-.233	.030	-.038	-.139	-.266	-.174
PANAS Δ Positive Affect	-.256	-.021	.177	.289	.350*	.156	-.087	.216	.024	.084	-.166	.148	.007	.026
PANAS Δ Negative Affect	.233	-.198	-.398*	-.228	-.513*	-.272	.062	-.395*	-.211	-.305*	-.248	-.372*	-.224	-.354*
BES Sexual Attractiveness	.052	.458*	.419*	.526*	.370*	.291	.268	.561*	.219	.063	.229	.368*	.262	.306*
BES Weight Concerns	-.072	.093	.106	.244	.122	.198	.173	.226	.220	.047	.207	.114	.198	.206
BES Physical Condition	-.092	.133	.250	.366*	.198	.298	.225	.354*	.197	.093	.152	.188	.260	.235
BES Total Score	-.048	.259	.295	.439*	.264	.307*	.260	.440*	.252	.079	.232	.256	.282	.292
EAT	.137	.135	-.016	-.054	.014	-.100	-.226	-.059	-.114	-.024	-.099	.018	-.247	-.123
BATT	.206	.084	-.215	-.120	-.032	-.153	-.359*	-.187	-.107	-.083	-.096	-.056	-.380*	-.195
Pursuing Cognitive	-.126	-.067	.172	.133	.139	.020	.129	.122	.030	.154	.068	.039	.114	.103
Pursuing Emotions	-.348*	-.003	.295	.277	.299	.179	.212	.303	.139	.037	.005	.216	.117	.140
Pursuing Social	-.193	.267	.371*	.394*	.164	.086	.321*	.365*	.148	-.015	.051	.314*	.190	.183
Pursuing Communication	-.172	.023	.170	.228	.260	.076	.227	.244	.068	.109	.153	.255	.286	.236
Pursuing Sensations	-.208	.021	-.063	.006	-.079	.135	.208	.056	.127	.124	.146	.202	.138	.193
Pursuing Anality	.080	.284	.321*	.219	.065	.050	.028	.223	.085	-.043	-.074	-.045	-.222	-.087
Distancing Cognitive	.220	.077	.122	.056	.088	.246	-.118	.125	.251	.101	.121	-.016	-.140	.068
Distancing Emotions	.312	-.048	-.196	-.371*	-.251	-.105	-.266	-.292	-.057	-.069	.111	-.123	-.283	-.117
Distancing Social	.025	-.175	-.173	-.215	-.045	-.039	-.257	-.209	-.035	.010	-.130	-.366*	-.343*	-.243
Distancing Communication	.055	.134	-.126	-.092	-.194	-.119	-.169	-.143	-.103	-.160	-.086	-.202	-.352*	-.242
Distancing Sensations	.077	-.207	.055	.138	-.005	.031	-.085	-.026	.028	-.130	-.115	-.147	-.076	-.116
Distancing Anality	.271	-.229	-.355*	-.221	-.287	-.154	.037	-.297	-.165	-.163	-.217	-.285	-.076	-.235

Note: SAS = Sexual Attitudes Scale; BES = Body Esteem Scale ; EAT = Eating Attitude Test ; BATT = Bulimic Automatic Thought Test; D = Desire; A = Arousal; L = Lubrication; O = Orgasm; S = Satisfaction; P = Pain; FS = Full Score; F1 = Contentment; F2 = Communication; F3 = Compatibility; F4 = Relational Distress; F5 = Personal Distress

* $p < .05$

Table 15. Correlation Coefficients between Predictors of Sexual Responses Explored in Study 2

Variables	SAS	FSFI							SSS_W				
		D	A	L	O	S	P	FS	F1	F2	F3	F4	F5
FSFI Desire (D)	-.159												
FSFI Arousal (A)	-.367*	.565*											
FSFI Lubrication (L)	-.374*	.433*	.724*										
FSFI Orgasm (O)	-.492*	.188	.695*	.663*									
FSFI Satisfaction (S)	-.148	.231	.359*	.271	.205								
FSFI Pain (P)	-.258	.140	.328*	.392*	.086	.257							
FSFI Full Scale	-.439	.610*	.883*	.821*	.699*	.596*	.515*						
SSS Contentment (F1)	-.266	.267	.366*	.283	.212	.752*	.132	.510*					
SSS Communication (F2)	-.076	.049	.311*	.106	.262	.523*	.073	.346*	.563*				
SSS Compatibility (F3)	-.102	.175	.264	.114	.264	.624*	.135	.412*	.576*	.633*			
SSS Relational Distress (F4)	-.350	.377*	.566*	.382*	.580*	.327*	.158	.593*	.357*	.354*	.503*		
SSS Personal Distress (F5)	-.289	.110	.410*	.324*	.362	.468*	.448*	.526*	.546*	.420*	.443*	.577*	
SSS_W Total Score	-.289	.259	.505*	.322*	.448*	.684*	.257	.626*	.770*	.743*	.809*	.747*	.792
SSSS Romantic/Passionate	-.127	.318*	.458*	.374*	.257	.207	.340*	.466*	.106	.031	.348*	.440*	.078
SSSS Open/Direct	-.178	.214	.323*	.199	.179	.093	.165	.280	.235	.245	.283	.334*	.273
SSSS Embarrassment/ Conservatism	.405*	-.281	-.156	-.235	-.207	-.061	-.040	-.237	-.249	-.100	-.042	-.287	-.227

Note: FSFI = Female Sexual Function Index; SSS = Sexual Satisfaction Scale; SSSS = Sexual Self-Schemas Scale.
* $p < .05$

Table 16. Correlation Coefficients between Predictors Investigated in Study 2

Variables	BES				EAT	BATT	Pursuing						Distancing					
	SA	WC	PC	TS			COG	EM	SOC	COM	SEN	AN	COG	EM	SOC	COM	SEN	AN
BES Sexual Attractiveness (SA)																		
BES Weight Concerns (WC)	.406*																	
BES Physical Condition (PC)	.559*	.712*																
BES Total Score (TS)	.758*	.861*	.900*															
EAT	.027	-.494*	.260	-.320*														
BATT	-.060	-.540*	-.450*	-.432*	.673*													
Pursuing Cognitive (COG)	.109	.350*	.462*	.370*	-.064	-.390*												
Pursuing Emotions (EM)	.082	.389*	.361*	.348*	.002	-.438*	.391*											
Pursuing Social (SOC)	.401*	.426*	.536*	.535*	.024	-.456*	.343*	.665*										
Pursuing Communication (COM)	.341*	.359*	.401*	.436*	.059	-.209	.430*	.543*	.495*									
Pursuing Sensations (SEN)	-.088	.275	.229	.177	-.119	-.233	.216	.325*	432*	.308								
Pursuing Anality (AN)	.196	.196	-.009	.154	-.137	-.062	-.162	.039	.096	-.017	-.090							
Distancing Cognitive (COG)	.163	.041	-.141	.024	.098	.321*	-.405*	-.041	-.098	-.401*	-.300	.231						
Distancing Emotions (EM)	-.105	-.320*	-.329*	-.305*	.172	.321*	-.243	-.490*	-.409*	-.477*	-.158	.030	.152					
Distancing Social (SOC)	-.370*	-.423*	-.523*	-.522*	.194	.473*	-.204	-.342*	-.713*	-.487*	-.434*	.013	.373*	.384*				
Distancing Communication (COM)	-.126	-.247	-.283	-.263	.030	.193	-.270	-.377*	-.271	-.858*	-.300	.066	.340*	.440*	.510*			
Distancing Sensations (SEN)	.003	-.250	.005	-.107	-.001	.018	-.041	.045	-.043	-.205	-.689*	.045	.241	-.021	.271	.314*		
Distancing Anality (AN)	.052	-.001	.077	.048	.272	.024	.185	.089	.057	.066	-.082	-.558*	-.089	.008	.154	.042	.062	
Romantic/Passionate	.461*	.208	.255	.357*	.096	-.063	.101	.301	.405*	.431*	.211	.177	.057	.048	-.311*	-.270	-.173	-.048
Open/Direct Schema	.260	.188	.115	.221	.224	-.095	.092	.241	.433*	.519*	.335*	.212	-.044	.151	-.460*	-.468*	-.400*	-.158
Embarrassment/Conservatism	-.126	-.198	-.075	-.162	.112	.058	-.016	-.124	-.245	-.289	-.346*	-.104	.265	.316*	.390*	.343*	.450*	.330*
PANAS Pre Positive Affect	-.086	.100	.017	.019	-.088	-.032	-.005	.362	.246	.099	.107	.344	.066	-.156	-.137	-.083	-.014	-.351
PANAS Pre Negative Affect	-.195	-.171	-.377	-.290	.130	.085	-.038	.066	-.211	-.200	-.097	.207	.230	.254	.355	.311	.060	.045
PANAS Δ Positive Affect	.034	-.152	.024	-.045	-.073	.059	-.330	.084	-.034	-.080	-.273	-.033	.127	-.237	.088	.038	.388	-.192
PANAS Δ Negative Affect	-.088	.062	.092	.031	.159	-.058	-.115	.112	.268	.228	.053	-.045	-.121	-.187	-.311	-.267	.073	.247

Note: BES = Body Esteem Scale; EAT = Eating Attitudes Test; BATT = Bulimic Automatic Thoughts Test.

* $p < .05$

4.2.5. Severity of Abuse and Sexual Responses

The severity of sexual abuse was assessed with the CTQ sexual abuse, physical abuse, and emotional abuse factors. Severity of sexual abuse was significantly associated with the VPA/SSA correlation coefficients, $r(37) = -.487$, $p < .01$. The severity of child emotional, $r = -.212$, $p = .23$, and physical abuse, $r = -.098$, $p = .58$, however, were not. A linear regression on the VPA/SSA correlation coefficients predicted by severity of sexual abuse explained 21.6% of the variance in VPA/SSA coefficients, $F(1, 31) = 9.83$, $p < .01$. No significant relationship was observed between type of abuse and VPA, $r(37) = .33$, $p < .847$, and type of abuse and SSA, $r(37) = -.133$, $p = .425$.

4.2.6. Predictors for Sexual Responses

Nine sets of hypothesized predictors of sexual arousal in CSA survivors were derived from the literature: 1) eating problems and body image, 2) comfort with intrapersonal closeness, 3) posttraumatic stress disorder, 4) dissociation, 5) affective responses before and after the erotic videos, 6) sexual-self views, 7) sexual satisfaction, 8) sexual function, and 9) sexual attitudes. A descriptive illustration of the relationship between the numerous predictors investigated in this study are illustrated in the correlation matrix summarized in Tables 14 - 16.

To confirm that these variables were associated with a history of CSA, a series of correlations were conducted between each variable and the severity of each type of abuse (i.e., sexual, physical, and emotional abuse), the frequency of the type of sexual behaviors that occurred during the abuse, and the severity of posttraumatic stress disorder

and dissociation symptoms. As illustrated in Tables 17 - 19 a pattern emerged in the relationship between frequency of the sexual behaviors that occurred during the abuse, the psychological distress, and the potential predictors of sexual responses explored in this study. The frequency of unwanted sexual behaviors results, especially frequency of vaginal penetration, was associated with sexual satisfaction, orgasm problems, and lower emotional pursuing. A pervasive relationship was observed between PTSD symptoms and pursuing/distancing patterns. Avoidance behaviors (Cluster C) and amnesia (dissociation symptoms) showed a significant relationship with a variety of dimensions of sexual function and satisfaction.

A series of partial correlations were conducted to identify variables that, within each set, showed the strongest relationship with VPA, SSA, and with VPA/SSA correlation coefficients. The variables that showed the strongest relationship with the outcome variables were used in a final regression analysis that used a composite of all surviving variables. We expected the majority of these variables to maintain a unique contribution to the model as evidence of the multidimensionality of the factors affecting the sexual responses of CSA survivors.

After an initial analysis of the data, it appeared that one participant was an outlier for a number of analyses. Her data plotted on the expected direction but fell over 3 *SD* away from the mean and had a strong leverage (e.g., LEV $\geq$ -4.3) on most of the analyses including the partial correlations between dissociation and VPA. It was the author's concern that the data from this participant would inflate the results, thus her data were excluded from all subsequent analyses. Table 2 shows the results of all the partial correlation analyses computed between each set of variables and VPA, SSA and the VPA/SSA correlation coefficients.

Table 17. Pearson Correlation Coefficients between Pursuing and Distancing Variables and Characteristics and Severity of the Abuse

		Pursuing						Distancing					
		COG	EM	SOC	COM	SEN	ANA	COG	EM	SOC	COM	SEN	ANA
Frequency Unwanted Sexual Behaviors	Non-invasive	.027	-.104	.041	-.012	.181	.125	-.008	-.004	-.148	.022	-.238	-.276
	Touch	.083	-.102	.010	-.166	.106	.066	-.061	-.075	-.056	.187	-.104	-.038
	Intercourse	-.191	.420**	-.023	-.217	.071	.190	-.168	.050	-.111	.282	-.187	.226
	Oral sex	-.147	.083	.123	-.077	-.067	.008	.043	-.103	-.177	.120	.200	.312*
	Anal penetration	-.024	.044	.213	-.060	-.114	-.010	-.005	-.151	-.164	.192	.058	-.160
Frequency Wanted Sexual Behaviors	Non-invasive	-.042	.132	.097	.076	.004	.063	.036	.391*	.034	-.090	.262	-.057
	Touch	-.234	-.083	-.140	-.053	.004	.114	-.093	-.026	.182	.029	.155	-.187
	Intercourse	-.202	.139	.049	.153	.018	-.098	-.059	-.146	-.152	-.270	.070	.031
	Oral sex	-.304	.001	-.127	-.063	-.043	-.142	.229	-.133	.218	-.026	.089	-.073
	Anal penetration	.111	-.285	.061	-.069	.256	-.006	.319*	-.032	-.169	.162	-.201	-.060
Severity by Type of Abuse (CTQ)	Sexual abuse	-.101	-.036	.087	-.033	.181	-.062	.083	.038	-.160	.019	-.118	.120
	Physical abuse	-.183	-.030	.163	-.041	.151	.064	-.024	-.121	-.159	.045	-.026	-.052
	Emotional abuse	-.044	-.092	.168	.022	.092	-.132	.027	.065	-.213	-.013	.204	.100
PTSD Symptoms (CAPS)	Cluster B	-.198	-.433**	-.070	-.166	-.196	.249	-.022	.188	-.107	.259	-.024	-.197
	Cluster C	-.427**	-.469**	-.424**	-.482**	-.108	.255	.312*	.316*	.307	-.513**	.027	-.189
	Cluster D	.385*	.406*	.328*	-.187	-.183	.070	.334*	.300	.283	.265	-.080	-.033
Dissociation	Amnesia	-.143	-.328*	-.243	-.067	.097	-.011	-.215	.242	.024	.144	-.211	.101
	Depersonalization	-.212	-.088	-.121	-.103	-.102	.148	.113	.206	.145	.205	-.025	.223
	Derealization	-.085	.044	.082	.051	-.052	.257	.003	.072	-.030	.118	.029	.097
Alcohol Use	AUDIT	-.040	.224	.314	-.156	.144	-.025	.013	-.294	-.153	.200	-.068	-.060

Note. COG = Cognitive; EM = Emotional; SOC = Social; SEN = Sensation; ANA = Anality.
* $p < .05$, ** $p < .01$.

Table 18. Pearson Correlation Coefficients between Sexuality Variables (SSSS, SSS_W, and FSFI) and Characteristics and Severity of the Abuse

		SSSS			SSS-W					FSFI					
		ROM	OPEN	EMB	F1	F2	F3	F4	F5	D	A	L	O	S	P
Frequency Unwanted Sexual Behaviors	Non-invasive	.115	.208	-.368*	.022	.144	.049	.200	-.028	.254	.007	-.062	-.054	-.149	.077
	Touch	.020	.068	-.092	.026	.258	.070	.151	.036	.179	.051	-.001	-.028	-.096	.166
	Intercourse	-.199	-.033	-.284	-.127	-.122	-.042	-.016	-.081	.354*	-.099	-.190	-.333*	-.223	-.143
	Oral sex	.011	-.039	-.144	-.046	.003	.092	.361*	.058	.111	.097	.005	.087	-.104	-.054
	Anal penetration	-.273	-.049	-.179	-.164	-.064	-.109	.171	.055	.181	.000	-.002	.128	.332*	-.113
Frequency Wanted Sexual Behaviors	Non-invasive	-.061	-.009	-.067	.149	.085	-.126	-.158	.126	-.133	.105	.303	.064	.049	.097
	Touch	-.171	-.089	-.075	.125	.076	-.114	-.211	-.116	-.073	-.108	.069	-.105	.023	-.127
	Intercourse	.040	.008	.106	.179	-.043	-.129	.038	.242	.040	.060	.177	.088	.061	-.130
	Oral sex	-.142	-.097	.121	.126	.131	-.035	-.026	.078	.069	.091	.189	.197	.109	-.080
	Anal penetration	.157	-.008	-.068	-.272	-.089	-.258	-.126	-.119	.176	-.080	-.041	-.278	-.282	.112
Severity by Type of Abuse (CTQ)	Sexual abuse	.124	.143	-.100	-.214	-.026	-.009	.127	-.103	-.072	-.199	-.263	-.162	-.253	.099
	Physical abuse	.119	.301	-.228	.087	-.036	.071	.221	-.010	.181	-.029	-.090	-.121	-.007	-.137
	Emotional abuse	.19	.298	.146	.069	-.054	.121	.109	.094	-.048	-.168	-.131	-.323*	.003	.004
PTSD Symptoms (CAPS)	Cluster B	-.055	.087	.095	-.485**	-.407**	-.226	-.020	-.250	.112	-.162	-.187	-.132	-.558**	-.067
	Cluster C	-.040	-.309*	.279	-.381*	-.361*	-.201	-.145	-.403**	.141	-.241	-.127	-.250	-.084	-.054
	Cluster D	.230	.019	.082	-.262	-.173	-.027	-.103	-.277	.018	.306*	-.157	-.178	-.205	-.199
Dissociation	Amnesia	.018	.037	.063	-.399**	-.246	-.112	-.180	-.335*	-.154	-.448*	-.408*	-.460**	-.350*	-.095
	Depersonalization	.058	.018	.249	-.488**	-.149	-.262	-.110	-.388*	-.033	-.212	-.256	-.295	-.364*	-.120
	Derealization	.153	.103	.176	-.483**	-.374*	-.241	-.137	-.383*	.000	-.147	-.222	-.284	-.353*	.036
Alcohol Use	AUDIT	-.209	-.031	-.2	.093	-.148	-.182	-.027	-.104	.226	-.011	.089	-.005	.053	-.054

Note: SSSS = Sexual Self Schema Scale; ROM = Romantic/Passionate; OPEN = Open/Direct; EMB = Embarrassment/Conservatism; SSS_W = Sexual Satisfaction Scale – Women; F1 = Contentment; F2 = Communication; F3 = Compatibility; F4 = Relational Distress; F5 = Personal Distress; FSFI = Female Sexual Function Index; D = Desire; A = Arousal; L = Lubrication; O = Orgasm; S = Satisfaction; P = Pain.
* $p < .05$, ** $p < .01$.

Table 19. Pearson's Correlation Coefficients Between Severity and Characteristics of the Abuse and Sexual Attitudes (SAS), Affect Reported Before the Erotic Video (PANAS), Eating Problems (BATT and EAT), and Body Image (BES)

		SAS	PANAS		BATT	EAT	BES		
Category	Variable		PRE_P	PRE_N			SA	WC	PC
Frequency Unwanted Sexual Behaviors	Non-invasive	-.021	.093	-.142	.226	.250	.110	-.113	-.091
	Touch	-.020	.106	-.075	-.111	-.056	.034	.103	.089
	Intercourse	.071	.062	.020	-.074	-.251	-.081	-.020	-.192
	Oral sex	-.129	-.004	-.069	-.031	.031	-.062	-.198	-.198
	Anal penetration	-.029	.050	.209	-.005	.022	.055	-.152	-.258
Frequency Wanted Sexual Behaviors	Non-invasive	-.193	.050	-.233	-.255	-.322*	-.119	.040	.021
	Touch	-.149	.172	-.133	-.016	-.203	.342*	-.187	-.211
	Intercourse	.194	.292	-.280	-.173	-.179	-.052	.103	.179
	Oral sex	-.146	.154	-.122	.192	.132	-.205	-.091	-.022
	Anal penetration	.011	-.137	-.103	-.077	-.020	-.041	-.081	.021
Severity by Type of Abuse (CTQ)	Sexual abuse	.156	-.001	.051	.189	.150	-.066	-.161	-.192
	Physical abuse	.056	.013	-.170	.138	.205	-.015	-.240	-.127
	Emotional abuse	.256	-.136	-.120	.169	.319	.090	-.249	-.066
PTSD Symptoms (CAPS)	Cluster B	.178	-.064	.188	.183	.090	.103	-.188	-.295
	Cluster C	.318*	-.205	.360*	.403**	.071	.013	-.188	-.246
	Cluster D	.270	-.144	.363*	.536**	.378*	.056	-.212	-.414**
Dissociation	Amnesia	.254	.225	.317*	.216	.133	-.203	-.175	-.320*
	Depersonalization	.334*	-.074	.491**	.222	.267	-.026	-.087	-.237
	Derealization	.268	.027	.467**	.144	.200	.020	-.098	-.167
Alcohol Sse	AUDIT	-.308	.202	-.106	-.055	.026	-.039	-.026	.000

Note: SAS = Sexual Attitudes Scale; PANAS = Positive and Negative Affect Schedule; BATT = Bulimic Automatic Thoughts Test; EAT = Eating Attitudes Test; BES = Body Esteem Scale.

* $p < .05$

4.2.6.1. Predictors of Physiological Sexual Arousal (VPA)

The variables that showed a significant correlation with VPA included Cognitive Distancing, r = -.305, Social Distancing, r = -.371, Anality Distancing (general tendency to avoid interactions), r = -.300, Embarrassment/conservatism sexual self-schema, r = -.385, the Lubrication's domain of the FSFI, r = .284, pre-video Positive Affect, r = .471, Sexual Attitudes, r = -.430, and Relational, r = .384, and Personal Distress, r = .382, as measured with the SSS_W. These variables were simultaneously included in a multiple linear regression model (Table 21) that explained 44.5% of the variance in VPA responses to the erotic video, $F(9, 37) = 4.03$, $p < .01$. A collinearity analysis indicated that none of the variables had a VIF > 1. The analysis of the residuals showed that only two data points fell 2 SD away from the mean, 2.79 and 2.40 SD. The leverage of these two points was .31 and .21, respectively, indicating that the results of this model were not the product of outliers. An analysis of the **B** coefficients revealed that, despite the high number of variables included in the model, several variables provided a unique contribution to the explanation of variance in VPA, including cognitive distancing, $\boldsymbol{B}$ = -.441, sensation distancing, $\boldsymbol{B}$ = .430, embarrassment/conservatism sexual self-schema, $\boldsymbol{B}$ = -.398, and pre-video positive affect, $\boldsymbol{B}$ = .45.

A series of HLM analyses were conducted to test the strongest predictors of VPA from each of the nine sets of variables (for a complete review of the results see Appendix I). The variables that showed the strongest relationship with changes in VPA from neutral to erotic videos (ps < .05) included Cognitive Distancing, γ = -.481, Communication Distancing, γ = -.267, Anality Distancing, γ = -.658, pre-video Positive Affect, γ = .073, Embarrassment/conservatism sexual self-schema, γ = -.080, Sexual satisfaction SSS_W,

Table 20. Partial Correlations for Each Variables Set and VPA, SSA and the VPA/SSA Correlation Coefficients

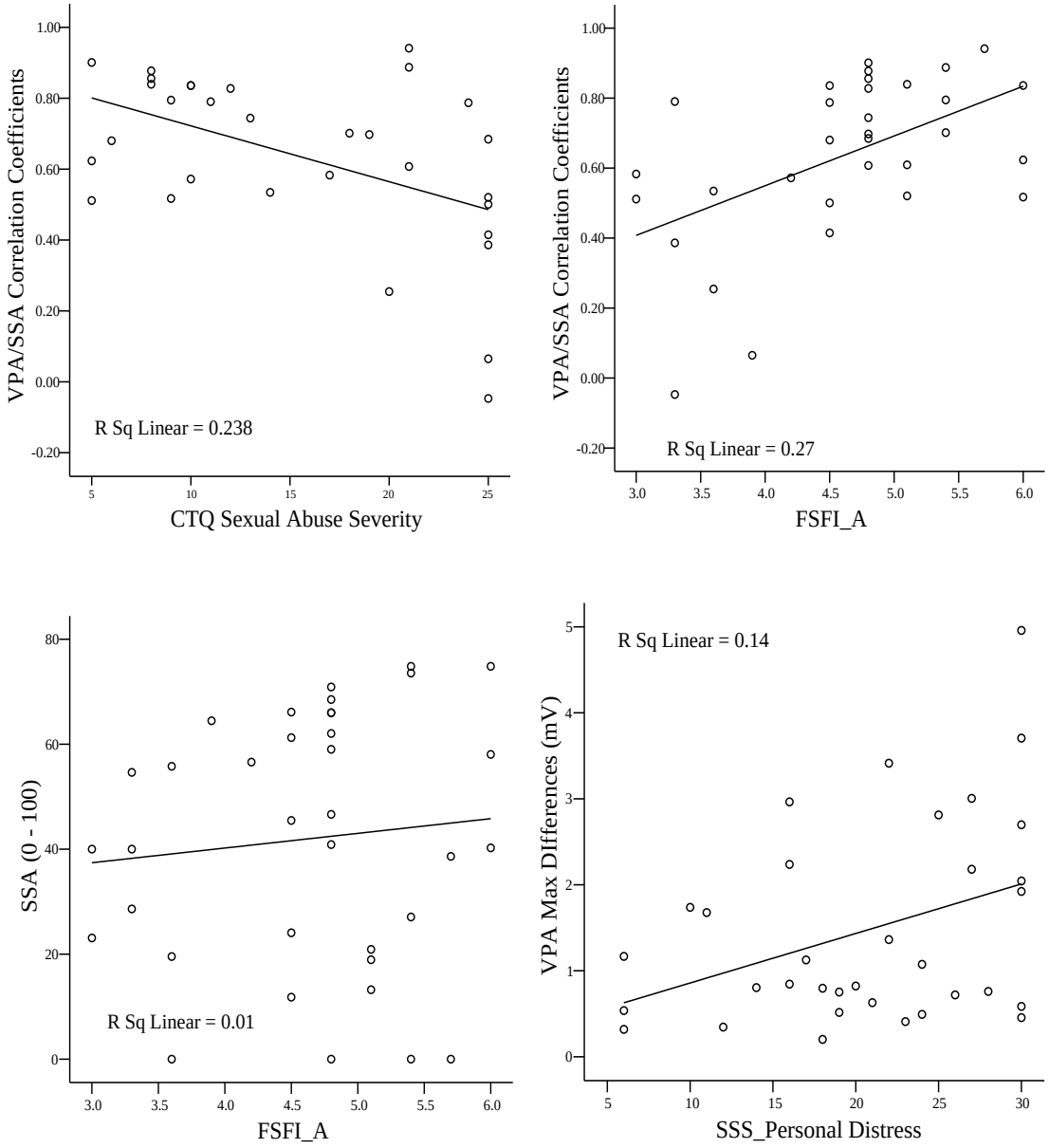
Variables	VPA		SSA		VPA/SSA	
	r	p	r	p	r	p
Pursuing (P_D)						
Cognitive	-.03	.434	-.14	.233	.01	.478
Emotional	.19	.149	.12	.261	.20	.158
Social	.18	.161	-.10	.299	.21	.143
Communication	.24	.092	-.00	.498	.38	.025
Sensations	.01	.486	-.21	.134	.04	.413
Anality	.24	.094	.27	.073	.14	.250
Distancing (P_D)						
Cognitive	-.30	.037	.11	.263	-.24	.093
Emotional	-.22	.100	.13	.224	-.44	.007
Social	-.37	.014	.11	.259	-.39	.014
Communication	-.24	.085	.11	.271	-.32	.041
Sensations	.13	.237	.25	.073	-.01	.470
Anality	-.30	.040	-.16	.188	-.28	.066
Eating Problems & Body Image						
Binge Eating (BATT)	-.07	.359	.02	.451	.04	.426
Eating Disorder (EAT)	-.14	.219	.06	.378	-.06	.384
Sexual Attractiveness (BES_SA)	.10	.275	.12	.254	.22	.114
Weight Concerns (BES_WC)	.10	.283	-.09	.295	.04	.413
Physical Condition (BES_PC)	.19	.140	.11	.257	.18	.168
Posttraumatic Stress Disorder (CAPS)						
Re-experiencing	-.12	.240	-.23	.084	-.18	.162
Avoidance	-.22	.097	.10	.280	-.22	.118
Hyperarousability	-.18	.148	.04	.408	-.02	.454
Dissociation (CADSS)						
Amnesia	.06	.365	-.20	.112	.01	.487
Depersonalization	.02	.451	.15	.184	.01	.472
Derealization	.09	.291	.04	.410	.23	.100
Affect (PANAS)						
Pre-Video Positive Affect	.47	.002	.20	.123	.41	.010
Pre-Video Negative Affect	-.18	.151	.23	.087	-.02	.453
Δ Positive Affect (after erotic video)	.16	.188	.31	.034	.03	.440
Δ Negative Affect (after erotic video)	-.09	.298	-.33	.025	.03	.435
Sexual Attitudes (SAS)	-.43	.004	-.11	.255	-.48	.003
Sexual Satisfaction (SSS-W)						
Contentment	.27	.055	.04	.409	.28	.063
Communication	.22	.102	.00	.493	.25	.088
Compatibility	.15	.191	-.15	.189	.27	.067
Relational Distress	.35	.019	.10	.273	.34	.029
Personal Distress	.38	.011	.01	.485	.33	.034
Sexual Function (FSFI)						
Desire	.01	.489	.07	.352	.37	.018
Arousal	.22	.099	.10	.281	.52	.001
Lubrication	.28	.047	-.04	.415	.49	.002
Orgasm	.24	.077	.02	.461	.34	.031
Satisfaction	.12	.241	.14	.216	.31	.042
Pain	.20	.121	.13	.224	.21	.122
Sexual Self Schema (SSSS)						
Romantic/Passionate	.04	.406	-.11	.262	.28	.063
Open/Direct	.28	.049	-.11	.257	.35	.024
Embarrassment/Conservatism	-.39	.010	-.07	.351	-.33	.034

Table 21. Linear Hierarchical Regression Coefficients for the Prediction of VPA and VPA/SSA Correlations Coefficients

Variable	B	SEB	**B**
VPA[a]			
Cognitive Distancing	-.937	.363	-.441*
Social Distancing	.244	.265	.191
Sensation Distancing	1.078	.398	.430*
SSSS Embarrassment/Conservatism	-.176	.084	-.398*
SSS_W Relational Distress	.066	.064	.183
SSS_W Personal Distress	.072	.057	.200
FSFI_Lubrication	.374	.516	.106
Sexual Attitudes	.024	.044	.101
Pre-Video Positive Affect	.142	.052	.450*
VPA/SSA Correlation Coefficients			
Full Model[b]			
Communication Pursuing	.010	.045	.075
Communication Distancing	.008	.045	.059
Emotional Distancing	-.081	.052	-.294
Social Pursuing	-.044	.025	-.331
SSSS Open/Direct	.001	.007	.024
SSSS Embarrassment/Conservatism	-.006	.008	-.131
SSSS Romantic/Passionate	-.015	.009	-.383
SSS_W Relational Distress	.011	.011	.279
SSS_W Personal Distress	-.004	.008	-.094
Pre-Video Positive Affect	.001	.005	.019
FSFI_Desire	.049	.061	.176
FSFI_Arousal	.120	.114	.359
FSFI_Lubrication	.162	.096	.449
FSFI_Orgasm	-.033	.061	-.149
Conservative Model[c]			
Emotional Distancing	-.054	.036	-.197
FSFI_Arousal	.160	.043	.490***
SSSS Embarrassment/Conservatism	-.014	.006	-.315*

Note: a. $R^2 = .45$ ($p < .01$). b. $R^2 = .53$ ($p < .01$), c. $R^2 = .49$ ($p < .001$),
*$p < .05$, **$p < .01$, ***$p < .001$.

Figure 5. Regression Lines Estimated for VPA, SSA and the VPA/SSA Correlation Coefficients as Predicted by Sexual Arousal Function (FSFI_A) and Sexual Satisfaction (SSS_Personal Distress)



γ = .024, and Sexual Attitudes, γ = -.041. All these variables were included as Level 2 predictors, and VIDEO (neutral = 0; erotic = 1) was used as Level 1 predictor (Table 22). This model (Appendix H, Equation 10) showed significantly smaller residuals compared to the fully unconditional model, $\chi^2(2) = 3548.36$, $p < .001$. Cognitive Distancing, $\gamma 11 = -.529$, $p < .05$, and pre-video Positive Affect, $\gamma_{16} = .061$, $p < .05$, showed a significant relationship with VPA changes when controlling for the other variables in the model (Figure 6).

4.2.6.2. Predictors of Subjective Sexual Arousal (SSA)

Only changes in Positive Affect and Negative Affect were significantly associated with SSA difference scores. The regression conducted on changes in Positive and Negative Affect predicted 5% of SSA variance, $F(2, 39)= 2.66$, p = 078.

A series of HLM analyses (see Appendix I for a review of all results) were conducted to examine the relationship between the set of variables and SSA changes with the erotic video. Sexual Arousal function (FSFI_A), γ = 6.67, Anality Pursuing, γ = 0.88, Re-experiencing symptoms, γ = -6.26, Open/direct sexual self-schema, γ = -1.17, Embarrassment/conservatism sexual self-schema, γ = -1.32, Sexual Attitudes, γ = -0.38, were the variables that showed a significant relationship with changes in SSA. When these variables were simultaneously inserted in the HLM model that used VIDEO (erotic = 1; neutral = 0) to estimate SSA (Appendix H, Equation 11) the residuals' deviance decreased significantly, $\chi^2(2) = 4775.29$, $p < .001$, indicating the model explained a significant portion of the variance in SSA (Table 22). In this model, Re-experiencing, γ_{13} = -5.93, was the only variable significantly related to the SSA changes from neutral to erotic videos when all other surviving variables were included in the model (Figure 6).

In an attempt to investigate a more conservative model, variables with a *t* value < 1.0 were excluded from the model, which turned out to include only Cognitive Pursuing. The conservative model did not vary from the full composite model in that Re-experiencing, γ_{12} = -5.25, remained the only variable showing a significant relationship with SSA during the erotic video.

4.2.6.3. Predictors of the Relationship between VPA and SSA

Partial correlations computed between each of the nine sets of predictors and the VPA/SSA correlation coefficients (Table 2) identified the following surviving variables: Communication Pursuing, *r* = .381, Communication Distancing, *r* = -.318, Emotional Distancing, *r* = -.436, Social Distancing, *r* = -.394, Open/direct sexual self schema, *r* = .351, Romantic/passionate sexual self-schema, *r* = .277, Embarrassment/conservatism sexual self-schema, *r* = -.328, pre-video Positive Affect, *r* = .411, and Relational, *r* = .338, and Personal Distress, *r* = .326, as measured with the SSS_W, and a number of the FSFI domains (Figure 5). The multiple linear regression used all survived variables in the composite model. This model explained 53.3% of variance in the VPA/SSA correlation coefficients (Table 21). None of the variables used in the composite model provided a unique contribution to the VPA/SSA correlation coefficients. In an attempt to identify a more conservative model, variables in the composite model that did not show significant partial correlations with VPA/SSA or that showed a Beta coefficient inferior to .10 were excluded from a second regression. This new model included only three variables, Emotional Distancing, Sexual Arousal function (FSFI_A), and Embarrassment/ conservatism. These three variables explained 48.7% of variance in the VPA/SSA coefficients, $F(3, 33) = 11.44$, $p < .001$. FSFI_A, ***B*** = .490, and Embarrassment/ conservatism, ***B*** = -.315, provided a unique contribution to the model. An analysis of the

residuals indicated that only one of the residuals was more than 2 *SD* away from the mean, M = 2.74, and the leverage of this point was LEV = .26, providing further evidence that the results of the regression were not due to an outlier in the sample.

Table 22. Multilevel Regression Estimate for SSA and VPA as predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Between-Participants Differences (Level 2)

	SSA = Outcome			VPA = Outcome	
Variable	Estimate	s.e.	Variable	Estimate	s.e.
Fixed Effect			Fixed effect		
Intercept	7.265	3.978	Intercept	2.224	1.582
COGNITIVE D	-.829†	.438	COGNITIVE D	-.277	.155
ANAL D	.014	.304	ANAL D	-.376†	.183
RE-EXPERIENCING	.302	.398	SSS_W	-.004	.011
SSS_W	-.065*	.026	EMBARRASS	-.003	.034
FSFI_A	1.101	.622	SAS	.034	.023
OPEN	-.016	.059	POS AFFECT	.059*	.028
EMBARRASS	-.056	.073	VIDEO	1.010	1.157
VIDEO	65.064**	2.091	VIDEO X COG D	-.529*	.217
VIDEO X COGNITIVE D	-1.776	1.873	VIDEO X ANAL D	-.601	.351
VIDEO X ANAL D	3.229	2.575	VIDEO X SSS_W	.010	.006
VIDEO X RE-EXPERIENCING	-5.395**	1.672	VIDEO X EMBARRASS	.008	.032
VIDEO X SSS_W	-.212	.126	VIDEO X SAS	.005	.016
VIDEO X FSFI_A	7.886	4.571	VIDEO X POS AFFECT	.061*	.024
VIDEO X OPEN	-.587	.471			
VIDEO X EMBARRASS	-.637	.360			
Random Component			Random Component		
Participant Level			Participant Level		
$Var(r_{ij}) = \sigma^2$	545.882	23.364	$Var(r_{ij}) = \sigma^2$	.797	.892
Group Level			Group Level		
$Var(u_{0j}) = \tau_{00}$	.515	.718	$Var(u_{0j}) = \tau_{00}$	1.332***	1.154
$Var(u_{1j}) = \tau_{11}$	293.841***	17.142	$Var(u_{1j}) = \tau_{11}$	1.343***	1.159
$Var(u_{0j}) = \tau_{22}$			$Var(u_{0j}) = \tau_{22}$		
$Var(u_{1j}) = \tau_{33}$			$Var(u_{1j}) = \tau_{33}$		
N. Parameters	4		N. Parameters	4	
Model Deviance	23078.079		Model Deviance	5617.846	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; COGNITIVE D= cognitive distancing, ANAL D= anality distancing or general tendency to avoid interactions, AVOIDANCE = avoidance behavior, cluster B for PTSD, SSS_W = satisfaction, FSFI_A = Female Sexual Function Index Arousal Domain, OPEN = open/direct sexual self-schema, EMBARRASS = embarrassment/ conservatism sexual self-schema; VPA = vaginal pulse amplitude; SAS= Sexual Attitudes Scale; POS AFFECT= positive affect before erotic video. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model. † $p <$ .07, * $p <$ .05, ** $p <$ .01, *** $p <$ .001.

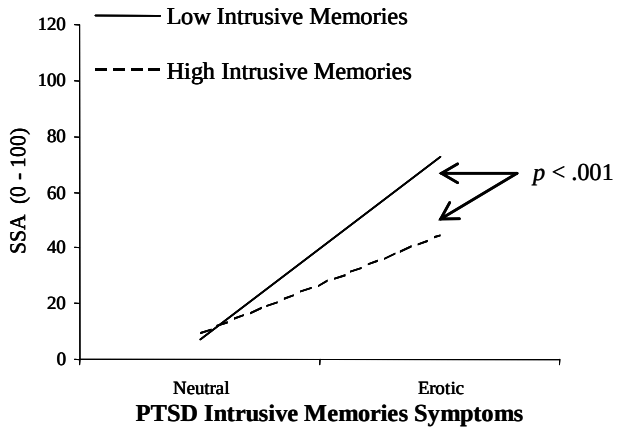
Table 23. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 0; Neutral = 1) and VPA x VIDEO (Level 1), and Estimated by Between-Participants Variables (Level 2)

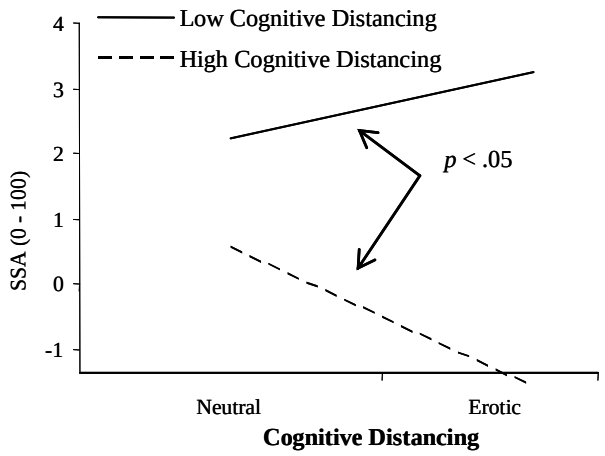
	SSA = Outcome	
Variable	Estimate	s.e.
Fixed effect		
Intercept	8.699	103.801
SEXUAL ABUSE	7.045***	1.544
EMOTIONAL ABUSE	-7.182**	2.087
COMMUNICATION DISTANCING	5.046	5.803
EMOTIONAL DISTANCING	1.415	11.988
SOCIAL DISTANCING	-.703	5.661
FSFI_A	-23.845	12.862
SEXUAL ATTITUDES SCALE	.387	.993
VPA	26.558	48.968
VPA x SEXUAL ABUSE	-2.777***	.726
VPA x EMOTIONAL ABUSE	3.029**	.983
VPA x COMMUNICATION DISTANCING	-4.815	2.717
VPA x EMOTIONAL DISTANCING	.318	5.512
VPA x SOCIAL DISTANCING	1.344	2.616
VPA x FSFI_A	12.071†	6.131
VPA x SEXUAL ATTITUDES SCALE	-.894†	.460
VIDEO	-4.515	92.008
VIDEO x SEXUAL ABUSE	-6.064***	1.375
VIDEO x EMOTIONAL ABUSE	5.869**	1.920
VIDEO x COMMUNICATION DISTANCING	-4.010	5.354
VIDEO x EMOTIONAL DISTANCING	-1.703	11.219
VIDEO x SOCIAL DISTANCING	-.429	5.115
VIDEO x FSFI_A	21.879†	11.219
VIDEO x SEXUAL ATTITUDES SCALE	-.448	.890
(VPA x VIDEO)	-24.542	39.830
(VPA x VIDEO) x SEXUAL ABUSE	2.296***	.595
(VPA x VIDEO) x EMOTIONAL ABUSE	-2.364*	.855
(VPA x VIDEO) x COMMUNICATION DISTANCING	4.022	2.325
(VPA x VIDEO) x EMOTIONAL DISTANCING	.626	4.770
(VPA x VIDEO) x SOCIAL DISTANCING	-.777	2.160
(VPA x VIDEO) x FSFI_A	-1.894*	4.882
(VPA x VIDEO) x SEXUAL ATTITUDES SCALE	-.778*	.372
Random Component		
Participant Level		
$Var(r_{ij}) = \sigma^2$	407.727	2.192
Group Level		
$Var(u_{0j}) = \tau_{00}$	2424.577***	49.240
$Var(u_{1j}) = \tau_{11}$	556.248***	23.585
$Var(u_{0j}) = \tau_{22}$	1637.695	4.468
$Var(u_{1j}) = \tau_{33}$	31.356	17.617
N. Parameters	11	
Model Deviance	21056.044	

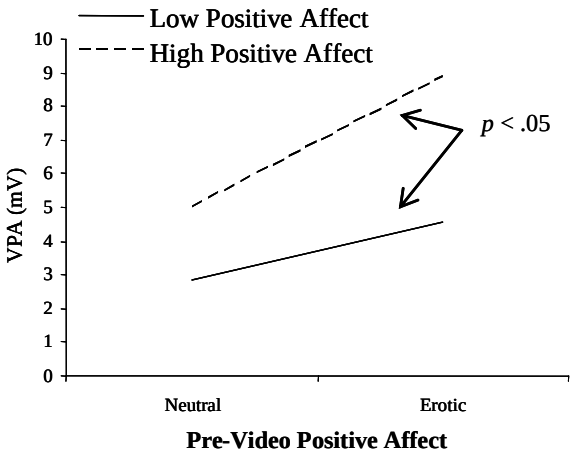
Note. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model. † $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Similarly to the previous analyses, each set of variables were used as Level 2 (between-participants) predictors in a separate HLM analysis for SSA as estimated by the Level 1 predictors: VPA, VIDEO (neutral = 1; erotic = 0), and VPAxVIDEO. A separate model was computed for each of the nine sets of variables which were used as between-participants (Level 2) predictors (Table 23). The results of each HLM analysis are reported in Appendix I. The variables that emerged from these analyses were Emotional Distancing, γ = -1.77, Social Distancing, γ = -1.35, Communication Pursuing, γ = 2.79, Sexual Abuse Severity, γ = -3.10, Emotional Abuse Severity, γ = 3.66, Sexual Arousal Function measured with the FSFI_A, γ = 11.68, and Sexual Attitudes, γ = -.96.

Figure 6. Lines Estimated with HLM Coefficients Calculated for the Composite Model Used to Predict SSA and VPA

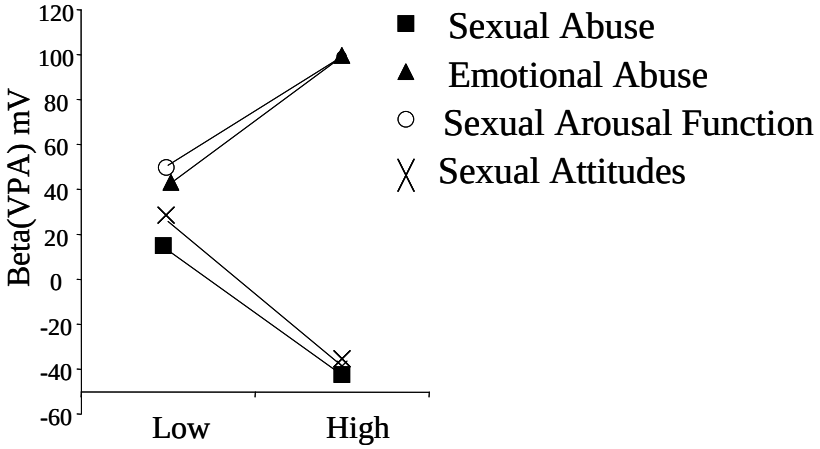






A composite model using all the Level 2 variables that survived the first set of HLM analyses significantly predicted SSA in that the residuals' deviance to 21,056.04, indicating a significant improvement in the estimation of SSA as compared to the Fully Unconditional Model for SSA where the Deviance was 27,853.38. As illustrated in Figure 7, the VPA estimate coefficient for SSA (Appendix H, Equation 12) was significantly affected by scores in Sexual Abuse Severity (γ_{11} = -2.78), severity in Emotional Abuse (γ_{12} = 3.03). A trend was also observed for Sexual Arousal Function (γ_{16} = 12.07) and Sexual Attitudes (γ_{17} = -.89). The γ coefficients for Sexual Abuse Severity, Emotional Abuse Severity, Sexual Arousal Function (FSFI_A), and Sexual Attitudes indicated that an increase in 1 SD in these variables corresponded to an increase in 21.43, 17.18, 12.67, and 12.95 units in the regression coefficient for the estimate of SSA by VPA. These coefficients corresponded to an increase in 14.9, 12.3, 9.0, and 9.2 *SD*s of VPA, respectively.

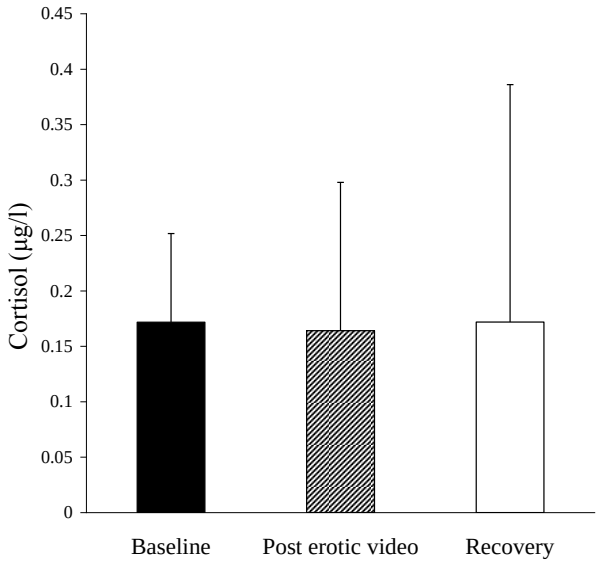
Figure 7. The Impact of Sexual Abuse Severity, Emotional Abuse Severity, Sexual Arousal Function, and Sexual Attitudes on the Estimate of SSA by VPA



Note: The outcome variable corresponds to the $\boldsymbol{B}_{oj}$ derived from the following equation (Video erotic = 0, neutral = 1):

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEO*VPA) + r_{ij}$$

Figure 8. Within Participants Cortisol Levels at Baseline, Post Erotic Video, and Recovery



4.2.7. Cortisol and Sexual Responses in CSA Survivors

Only participants who complied with the prerequisite for cortisol data collection (i.e., no food or cigarettes for 1 hr prior to the study, no intense exercise the day of the study, and no use of amphetamine or high doses of caffeine for the 24 hrs preceding the study) were included in the following analyses. One participant showed a very high level of cortisol throughout the study. This participant also scored 2 *SD* above the mean in severity of dissociation and PTSD symptoms, a potential explanation for her high level in cortisol. Her data were excluded and analyses on cortisol levels were computed on a total of 29 women. Baseline levels of cortisol collected at the beginning of the session were strongly and positively correlated with the severity of the sexual abuse history measured with the CTQ ($r = .434$, $p < .05$). Measures of PTSD symptoms, Dissociation or type of Sexual Behavior reported during the incidence of sexual abuse were not associated with cortisol levels (Table 23). On average, women showed no significant changes in cortisol

levels from before to after the erotic video, $F(1, 28) = .033$, $p = .968$ (Figure 8). Difference scores in cortisol from pre to post erotic video indicated that 12 women showed an increase in cortisol level and 18 women showed a decrease.

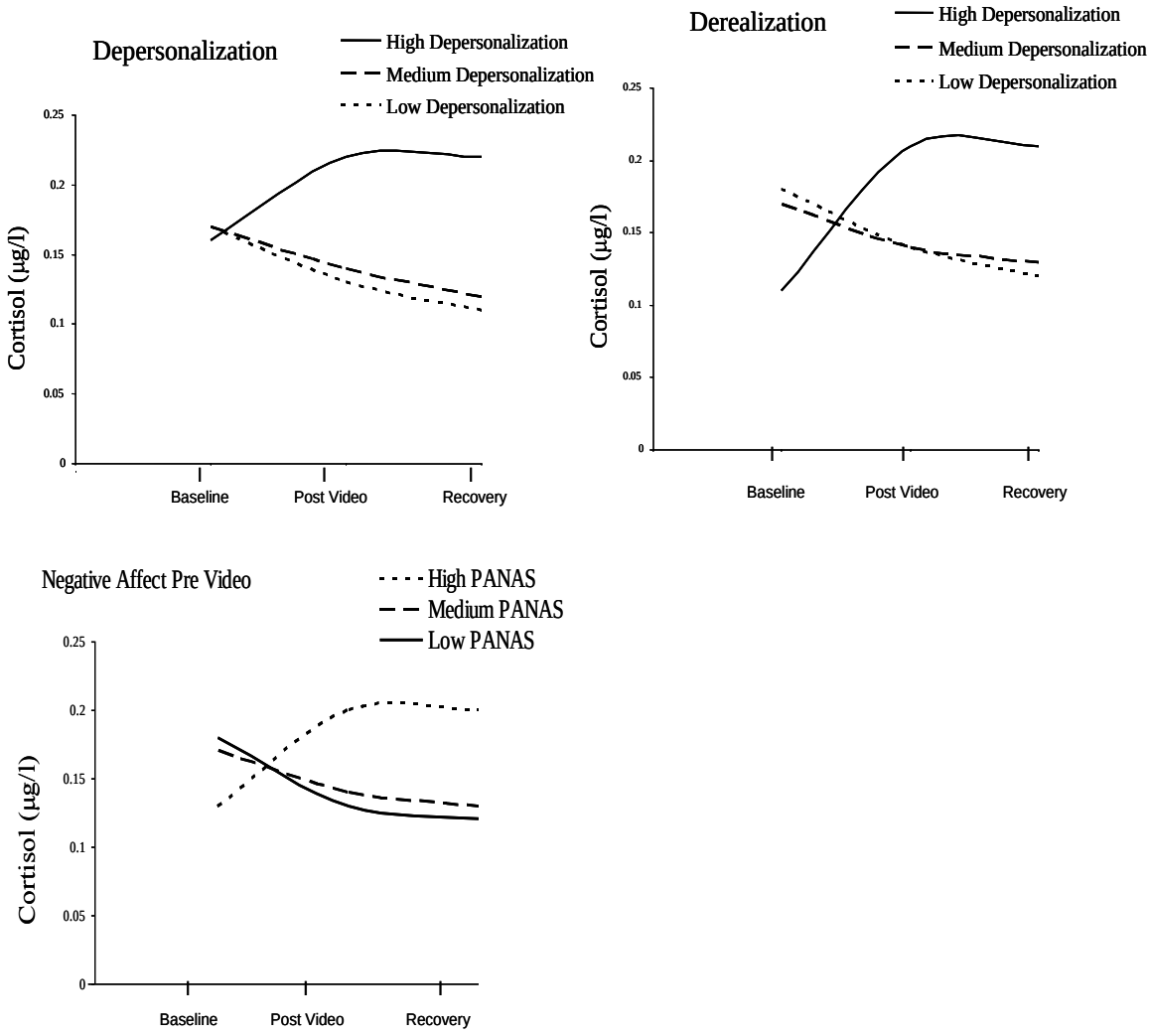
Table 23. Correlation Coefficients between Cortisol Levels at Baseline, Post-Video and During Recovery and Measures of CSA Severity and Psychiatric Symptoms

	Baseline (B)	Post-video (P)	Recovery	Change (P-B)
Frequency of Unwanted Sexual Behaviors				
Non-invasive	.124	.103	.065	.104
Touch	.307	.321	.240	.140
Intercourse	-.036	-.039	-.095	-.185
Oral sex	.080	.042	-.096	.189
Anal penetration	-.020	.056	-.058	.113
Frequency of Wanted Sexual Behaviors				
Non-invasive	-.097	.113	-.146	.168
Touch	.043	.067	-.052	.276
Intercourse	-.145	-.244	-.315	-.211
Oral sex	-.121	-.202	-.150	-.097
Anal penetration	-	-	-	-
Childhood Trauma Questionnaire				
Sexual abuse	.434*	.243	.159	-.060
Physical abuse	.037	-.039	-.191	-.066
Emotional abuse	.030	-.179	-.115	-.158
PTSD Symptoms				
Cluster B	-.131	-.218	-.146	.174
Cluster C	-.117	-.002	-.028	.116
Cluster D	-.301	-.021	-.095	.369
Dissociation Symptoms				
Amnesia	.229	.127	.116	.063
Depersonalization	-.003	.353	.350	.382
Derealization	-.242	.271	.297	.391
Alcohol Use (AUDIT)	-.186	-.232	-.283	-.073

* $p < .05$

Repeated-measures ANOVAS revealed that cortisol changes after exposure to an erotic video (Baseline, Post-Video, and Recovery) became significant when controlling for between-participants levels of dissociation reported during sexual interactions with a partner, F(2,26)+ 5.14, $p< .05$. When levels of dissociation were included in the model, cortisol changes with exposure to the erotic video were best explained by a linear model, $F(1, 27)= 1.29$, $p<.01$. The relationship between changes in cortisol and dissociationwas also linear, $F(1, 27) = 7.42$, $p < .05$. An analysis of percentage change in cortisol revealed the same results with factors measuring state dissociation significantly predicting cortisol responses to the erotic videos, $r = .363$, $p < .001$. Figure 9 illustrates how both depersonalization, $F(2, 26) = 4.54$, $p < .05$, and derealization, $F(2, 26) = 7.93$, $p < .001$, factors of the Clinician Administered Dissociation Scale were associated with changes in cortisol during exposure to the erotic video

Figure 9. Predictors of Changes in Cortisol Levels after Exposure to the Erotic Video



Chapter 5: Discussion

5.1. Study 1

A number of studies have been conducted on the incidence and prevalence of sexual dysfunction among CSA survivors (for a review, see Loeb et al., 2002; Leonard & Follette, 2002), but very little is known on the mechanisms involved in the sexual dysfunction of women with a history of CSA. This study was designed to investigate the physiological and subjective sexual responses measured in the laboratory setting in women with and without a history of CSA. The three aspects of the sexual response investigated in this study included: physiological sexual arousal measured with vaginal photoplethysmography (VPA), continuous measures of subjective sexual arousal measured with the Arousometer (SSA), and the relationship between the two types of sexual arousal (VPA/SSA). For the sake of clarity, a discussion of the results is presented for VPA first, followed by SSA, and finally the VPA/SSA relationship.

Similarly to previous studies that recruited participants from the community, in this study, women with a history of CSA showed, on average, more sexual problems than women in the NSA group in the areas of sexual arousal and lubrication, and greater sexual distress. The type of sexual abuse described by women in the CSA group included a variety of sexual behaviors and different relationships with the perpetrator(s). Six women reported that vaginal intercourse occurred during the abuse and the majority of women reported that the perpetrator was a family member. Given that previous studies have found that vaginal penetration and a familial relationship with the perpetrator were two of the factors that predicted whether women felt the abuse negatively affected their sexual function (Rellini & Meston, in press), the women in this study are likely to

represent a population that is at higher risk for sexual problems and therefore representative of the sample of CSA survivors to which this study wants to generalize.

5.1.1. Physiological Sexual Arousal

The two hypotheses of Study 1 were in regard to differences between CSA and NSA groups in VPA responses. Differently from what was hypothesized, CSA and NSA groups overall did not show any significant difference in their increase in VPA response. These results indicate that overall, a history of CSA does not necessarily cause impairment in the physiological sexual responses of women. Indeed, a number of women with a history of CSA do not report disturbances in their sexual health. These results are in agreement with the literature on trauma survivors and psychological well being. Similarly to what was observed in this study, not all women who experienced CSA developed impairments in their dysfunction. The next question that logically follows from this finding regards the potential protective factors that allow some women to develop satisfying sexual relationships. Part of this question is addressed in Study 2 where a number of variables have been used to control for potential differences in the type of sexual abuse or the consequences of the sexual abuse on the psychological well-being.

Based on previous studies that found a lower VPA response in CSA survivors compared to women with no history of CSA (Laan & Everaerd, 1995; Rellini & Meston, 2006), and on the literature that points at physiological impairments in the nervous systems involved in genital sexual responses (i.e., the sympathetic nervous system), it was hypothesized that impairments in the genital response of CSA survivors would be associated with their sexual function and sexual distress. The results partially confirmed

these hypotheses in that greater sexual distress, measured with the SSS_W, was associated with lower VPA responses in CSA survivors. In agreement with past studies, for women in the NSA group, sexual distress was not associated with physiological sexual responses (e.g., Meston & Gorzalka, 1995; Morokoff & Heiman, 1980; Laan & Everaerd, 1995). In addition, when controlling for levels of sexual distress, women with a history of CSA had significantly lower physiological sexual responses compared to women in the NSA group. These results suggest that for women with a history of CSA, impairments in genital sexual response were linked to their sexual distress.

There are a number of viable explanations for why women in the NSA group did not show a relationship between sexual distress and genital sexual responses measured in the laboratory. One feasible explanation is that the factors that inhibit sexual arousal in women with a history of CSA may be general and therefore may be active even in settings where the individual is not interacting in a sexual manner with a partner. Conversely, the inhibiting factors that affect the sexual response of women with no history of CSA may not be activated during the exposure to a sexual stimulus in a laboratory because their inhibitions may be more specific to the sexual interactions with a partner. Future studies that investigate physiological sexual responses in more realistic settings (i.e., in a bedroom with the partner) may provide a better picture of whether the VPA response impaired in women with and without a history of CSA is dependent on the context.

To elaborate on the group differences observed in the relationship between sexual satisfaction and VPA responses, it is plausible that the sexual distress of women in the two groups may be essentially different. When women in the CSA group answered questions about sexual distress they may have referred to their fear of "letting go" during sex, while women in the NSA group may have answered thinking of their desire to

become more aroused. Indeed, qualitative studies on CSA survivors have pointed at feelings of guilt and shame associated with sexual arousal (Gold, 1986; Heiman, et al., 1986; Westerlund, 1992). A woman who feels guilty for becoming sexually aroused may inhibit (volitionally or automatically) her physiological sexual response. In support of this theory, sexual arousal function (FSFI_A) was not significantly associated with VPA responses, indicating that the relationship between sexual distress and VPA observed in CSA survivors was not explained by problems in sexual arousal function as defined in the *DSM-IV-TR*.

The design of this study does not provide information on the direction of the relationship between sexual distress and impaired physiological sexual response. According to the sexual arousal model proposed by Barlow (1986), expectations in a situation of sexual arousal affect the autonomic arousal which, in response, directs attention to either feelings of inadequacy or to the erotic stimuli. Based on this model, it is possible to speculate that sexual distress may lead to negative expectations which in turn leads to an impaired genital sexual response. However, it is also plausible that the inability to become physically sexually aroused may be the cause of distress, thus indicating the opposite direction of this relationship.

While the question of whether sexual distress or impaired genital response occurred first can be an important one to better understand the link between a history of CSA and sexual function, investigating the maintaining factors of both sexual distress and impaired genital response may have greater clinical value. In particular, future studies designed to increase physiological sexual response during the sexual interaction with the partner may help to better understand the nature of the woman's sexual distress. Interestingly, in one study where sildenafil was used to increase physiological sexual response in women with a history of sexual abuse, the subjective response of the

participants was of increased distress in the presence of an increased physiological sexual response (Berman, Berman, Bruck, Pawar, & Goldstein, 2001). Perhaps, cognitive inhibition of the genital sexual responses in CSA survivors may have an important function for CSA survivors because it may promote a feeling of being in control. Bypassing the inhibition through physiological means, such as increasing genital responses with a pill, may overlook the function of the inhibition which results in greater distress. This hypothesis ties back to the previously explored need reported by many CSA survivors to feel "in control" during sexual activities (Westerlund, 1992).

The explanation of an inhibited physiological sexual response can be understood better within the context of the Dual-Control Model (Bancroft & Janssen, 2000). According to this theory, physiological and subjective forms of sexual arousal responses are the product of the balance between excitatory and inhibitory forces. On the premises provided by studies on the physiological/autonomic model of sexual arousal (Janssen et al., 2000) physiological sexual responses are affected by implicit and/or physiological factors, while subjective experiences are affected by conscious processes. Therefore, it is feasible that, for women with a history of CSA, physiological sexual responses may be inhibited by physiological or implicit processes. Perhaps, the overactive sympathetic nervous system or impairments in the amygdala or the HPA axis observed in trauma survivors (Yehuda, 2003) may play a role in the inhibited VPA response of CSA survivors experiencing sexual distress. Indeed, previous studies of CSA survivors reported that, differently than in non-abused women, increasing SNS activity through exercise did not have an enhancing effect on VPA (Rellini & Meston, 2006). Previous studies on implicit sexual attitudes have also pointed to an abnormal lack of implicit association between sexual stimuli and positive affect (Rellini, Ing, & Meston, 2007). Thus, it is likely that the traumatic sexual experience endured during childhood may have

distorted the autonomic association between sexual stimuli and sexual arousal. Identifying potential factors involved in the inhibition and excitation of physiological sexual response is the next necessary step towards the development of treatments for sexual dysfunction experienced by CSA survivors.

5.1.2. Subjective Sexual Arousal

Continuous levels of subjective sexual responses (SSA) were used as an indication of how mentally aroused women felt during the exposure to the erotic videos and how this was associated with their sexual function and sexual distress. Previous studies have not found overall differences between women with and without a history of CSA in subjective sexual responses to erotic videos shown in a laboratory setting (Rellini & Meston, 2006), which has led to hypothesize that women with and without a history of CSA may not vary in their subjective sexual experiences while in a laboratory. Based on studies that indicated that women attend more external than internal cues to generate emotions (Pennebaker & Roberts, 1992), it was speculated that differences in levels of subjective sexual arousal would be easier to observe in a natural setting when the participant is with her partner rather than in a laboratory. Interestingly, group differences were observed when using t-tests to compare continuous measures of subjective sexual arousal reported throughout the exposure to the erotic videos. The CSA group reported lower levels of sexual arousal as compared to the NSA group. However, these results were not confirmed by the HLM analysis which compared how quickly the two groups reached highest levels of sexual arousal, nor was it confirmed by t-tests on the self-reported questionnaires administered before and after the erotic videos. This discrepancy in results raises important methodological questions. Specifically, future studies needs to

address whether these three types of analyses provide different results because of the different constructs tested or whether they are the product of methodological problems raised by testing a complex form of nested data affected by individual differences.

A potential explanation that addresses methodological differences in the way the data is analyzed would take into consideration statistical differences between t-tests and HLM analyses of nested data where repeated individual observations are compared between participants. To compute t-tests, the continuous nested data were reduced to one score; HLM took into consideration change scores and the nested nature of the data thus controlling for potential individual differences affecting between-groups analyses. An alternative explanation for the differences between the two analyses would consider the lower SSA scores reported by the CSA group as the product of the difference in the effect of contextual cues between CSA and NSA groups. Specifically, the contextual cues (i.e., film watched in a laboratory vs. real life interaction with a partner) may play a more important role in the sexual lives of the NSA group, while for CSA survivors, the sexual problems they experience are so pervasive that they show even in artificial settings. To put this in the perspective of the Dual-Control Model (Bancroft, 1999), a sexual stimulus presented within an artificial environment may provide less excitation, and the environment itself may have more inhibitory effects for women in the CSA group as compared to women in the NSA group.

An alternative interpretation of the findings is that hypothesis guessing may contribute to the observed differences between groups. Participants knew that the aim of the study was to investigate the sexual responses of CSA survivors, thus, CSA survivors may have purposely reported lower subjective sexual responses than they experienced. However, this would not explain why only one of the three measures showed group differences.

When controlling for sexual arousal function (FSFI_A), results from the HLM analyses showed a significant group difference in SSA scores between the CSA and the NSA groups. Sexual arousal function positively and significantly predicted subjective sexual arousal for the CSA but not the NSA group. Consistent with the HLM results, the simple regressions also showed a trend (p = .07) towards an interaction between FSFI_A and SSA, in that for women with a history of CSA, sexual arousal function was positively associated with greater SSA scores. As previously discussed, the difference in results between HLM and regressions may be attributable to the superiority of HLM for analyzing nested data. These results nicely match the pattern showed by VPA, in that sexual responses measured in the laboratory were linked to relevant aspects of women's sexuality for the CSA but not the NSA group. Once again, this finding is an indication of a potentially different nature of the sexual problems of CSA survivors compared to women with no history of sexual abuse. It is possible that the significant relationship between SSA and sexual function in the CSA, but not the NSA group, may be an indication that the inhibitory factors affecting SSA in CSA survivors may be more general and pervasive than for non abused women. In other words, the what inhibits subjective sexual arousal in CSA survivors is present both in a laboratory setting and during intimate interactions with their partners, while for non-abused women, what inhibits subjective sexual arousal is active during sexual interactions with their partner but not during the laboratory assessment. For example, CSA survivors may have a negative view of sexuality in general or a inhibit view of their sexual self, thus they may feel inhibited in their sexual feelings independently from the context. Conversely, for non-abused women, inhibitory factors may include feeling uncomfortable when naked in front of their partners, which is a factors not likely to be activated during sexual arousal induced in a laboratory setting. In support of this interpretation, studies on sexual views

of CSA survivors have reported an association between negative affect and sexual words in CSA survivors (Meston & Heiman, 2000), and less positive sexual self-schemas in CSA survivors compared to non-abused women (Meston, et al., 2006; Rellini & Meston, in press).

5.1.3. The Relationship between Physiological and Subjective Sexual Responses

Two aspects of the relationship between physiological and subjective sexual arousal (VPA/SSA) were investigated in this study, *synchronicity* and *balance*. Synchronicity was operationalized as individual correlation coefficients between VPA and SSA, and balance was operationalized as the strength with which changes in VPA estimated changes in SSA (HLM coefficients). Since the HLM slopes were calculated using SSA as the outcome variable and VPA as the within-participants predictor, higher HLM coefficients presented in this study should be interpreted as evidence of higher estimated subjective sexual responses in the presence of an equal between-participants VPA response.

The results of this study confirmed that VPA accurately estimated SSA scores during exposure to erotic stimuli, meaning that an increase in VPA was associated with an increase in SSA scores. This finding is congruent with previous studies using similar data analysis strategies that focused on the VPA/SSA relationship within stimuli (Meston & Rellini, 2006a; Meston, Rellini, McCall, 2006; Rellini, et al; 2005), but is in disagreement with studies that analyzed the VPA/SSA concordance between stimuli (e.g., Laan, Everaerd, van der Velde, & Geer, 1995). The incongruence between these results can be traced to the different questions that the studies addressed on the relationship between physiological and subjective sexual arousal. While in the present study the aim

was to establish how subjective and physiological sexual arousal change in respect to each other during the presentation of a sexual stimulus, previous studies have given a greater importance to the consistency of subjective and physiological sexual arousal to different sexual stimuli. That is, while this study looks at the changes in VPA and SSA in respect to each other, previous studies have tried to identified whether an overall increase in VPA can be paired to a specific subjective response across participants and across time.

Based on previous studies and on the documented mind-body disconnection of CSA survivors (Mills & Daniluk, 2002), it was hypothesized that both synchronicity and balance of the VPA/SSA relationship would be significantly lower among CSA survivors as compared to women in the NSA group and that this relationship would be associated with levels of sexual function and sexual distress in CSA survivors. CSA survivors overall, did not show an impairment in the relationship between VPA and SSA. Thiese results are in agreement with the results observed for VPA and SSA and reiterate that a history of CSA is not necessarily linked to impairments in the sexual health of adult women.

Similarly to what observed in the prior analyses of VPA and SSA, CSA survivors showed a significantly lower VPA/SSA correlation coefficient than non-abused women when controlling for sexual function variables (i.e., FSFI_A). Also, as hypothesized, higher FSFI_A scores were associated with a greater correlation coefficient (synchronicity) for the VPA/SSA relationship shown in CSA survivors. This result suggests that CSA survivors with sexual problems have a weaker VPA/SSA relationship. The observed disagreement between physiological and subjective sexual arousal in CSA survivors with sexual arousal dysfunction may indicate that factors that inhibit one form of arousal but not the other may be actively shaping the sexual responses measured in the

laboratory. The differential response of mind and body during situations where sexual stimuli are present is probably not unusual for CSA survivors. As indicated by clinical reports, women have experienced automatic physiological sexual arousal such as lubrication during sexual abuse in the presence of no subjective experiences of sexual arousal (Angier, 1999). It has been hypothesized that the genitals may be wired to respond automatically with increased vasocongestion and lubrication to prevent more severe physical harm during a forced sexual penetration. Therefore, CSA survivors may have learned at a very young age not to associate physiological sensations of sexual arousal with pleasure.

When analyzing the balance (HLM coefficients) between VPA and SSA, the results were partially reproduced in that VPA responses were associated with greater SSA responses in the NSA group compared to the CSA group. However, only a trend was observed in CSA survivors in the relationship between sexual function and greater SSA responses when controlling for VPA. These results can be the product of more than one phenomenon. First of all, the lack of a significant correlation between VPA and SSA may create problems in the interpretation of the HLM results. Indeed, the lack of correlation usually precludes the significance of a regression coefficient. Alternatively, there may be a theoretical explanation for this finding. In the analysis of VPA and SSA, I observed that the inhibition of these responses was associated with sexual function and sexual distress in CSA survivors. It is likely that the inhibition of these responses acts at the central level meaning that it equally influences both physiological and subjective sexual responses and therefore the balance between the two sexual responses is not affected. However, the presence of a trend does not allow for a clear speculation of the results since it could also be the case that a larger sample may have provided a greater power to either accept or reject the Null Hypothesis. Future studies that investigate the VPA/SSA relationship in

CSA survivors using a larger sample may be able to better clarify these preliminary results.

Similarly to the results for the VPA and the SSA responses, the VPA/SSA relationship was not associated with FSFI_A or SSS_W for the NSA group. That is, the synchronicity of the physiological/subjective sexual responses was not significantly associated with sexual function or sexual distress in non-abused women. Once again, the lack of association of sexual responses in the laboratory with sexual function and sexual distress raises the question of whether psychophysiological assessment is a valid clinical tool for assessing the sexuality of non-abused women. Given the lack of association between these variables, it is feasible that the problems that affect the sexuality of non-abused women may not become as easily activated in a laboratory setting.

5.1.4. Conclusions

This was the first study to compare physiological and subjective sexual responses of women with and without a history of CSA. Previous studies have spoken to the importance of identifying the etiology of sexual problems in CSA survivors and made speculations on the potential emotional or cognitive factors involved in sexual function among CSA survivors (for a review, see Leonard & Follette, 2002). However, to my knowledge, no studies to date have conducted an in depth analysis of both physiological and subjective sexual responses in CSA survivors and how sexual responses may be associated with sexual function and sexual distress.

From the findings presented in this study, it appeared that the sexual responses of CSA survivors are not generally impaired compared to women with no history of CSA. As hypothesized, aspects of sexual problems (i.e., sexual distress or sexual function) in

women with a history of CSA was significantly associated with weaker sexual responses as measured during a laboratory psychophysiological assessment. CSA survivors were experiencing impairments in all three dimensions of sexual responses investigated in this study. The higher the sexual distress reported by CSA survivors the lower was the VPA response. Also the higher the problems with sexual arousal function (FSFI_A) the lower the overall SSA and the lower the synchronicity between SSA and VPA. This means that the sexual difficulties of CSA survivors were linked to lower physiological and subjective sexual response to sexual stimuli and to greater independence between VPA and SSA responses.

An interesting pattern emerged in the analyses of sexual function and sexual distress and their association with the sexual responses measured in the laboratory. While in the CSA group sexual distress and sexual function were significantly associated with their sexual responses, this was not true for the NSA group. The lack of relationship between sexual function and physiological sexual arousal has been well documented in the literature (e.g., Heiman & Morokoff, Meston & Gorzalka, 1996b; Laan & Everaerd, 1995). The significant association between sexuality and sexual responses in the CSA survivors raises two important points. First, it appears that there is a salient difference in the sexual problems of CSA survivors compared to non-abused women. Until now, no specific treatments have been developed for women with a history of CSA who suffer of sexual dysfunction. This study is the first to provide initial empirical evidence that CSA survivors with sexual problems may experience an inhibition of both physiological and subjective sexual arousal that is essentially different from what non-abused women experience. Second, the fact that sexual arousal was inhibited even in a relatively safe environment where women did not have to interact with a partner may indicate that the inhibition of the sexual responses in CSA survivors may be more pervasive than in non-

abused women with sexual dysfunction. This information has important clinical implications since it suggests that aspects of the sexual difficulties experienced by CSA survivors may need to be treated at the individual level first by addressing what inhibits both physiological and subjective sexual arousal. After a woman is able to disengage from the inhibition of her sexual responses then she can learn to use these skills in a sexually safe and fulfilling intimate relationship. Given the available models for sexual responses, it is possible to interpret the impaired sexual responses of CSA survivors as a preliminary evidence for strong inhibitory effects and/or weak excitatory effect of the

Physiological/automatic and the psychological/cognitive levels. According to the cognitive processing model of sexual response (Spiering et al., 2003), physiological sexual responses are more closely affected by automatic, implicit processes. Alternatively, subjective experiences of sexual arousal are more closely associated with, and influenced by, volitional forces. Given that both physiological and subjective sexual responses in CSA survivors with sexual problems were lower than in survivors with no sexual problems, it is likely that the inhibiting factors of sexual responses for these women is the product of an intertwined network of automatic, physiological and volitional, psychological elements. A greater understanding of what factors inhibit and excite both physiological and subjective sexual arousal is paramount for the development of treatments specific to women with a history of CSA. Based on these premises, Study 2 was designed to begin exploring of the potential inhibitory and excitatory factors involved in the physiological and subjective sexual response of CSA survivors.

5.2. Study 2

The aim of Study 2 was to explore predictors of VPA, SSA, and the VPA/SSA relationship in women with a history of CSA. These predictors were deemed important since they may provide information on the inhibition and excitation of physiological and subjective sexual responses. Two types of predictors were identified based on a review of the literature on female sexual arousal and on the long term consequences of a history of CSA; physiological predictors and psychological/cognitive predictors. The reason for a distinction between these two types of predictors is rooted in the evidence for a conscious and cognitively based pathway involved in the development of subjective sexual arousal along with an implicit and unconscious pathway (Janssen et al., 2000).

A multitude of inhibitory and excitatory factors have been identified in women (Graham, et al., 2004). For the purpose of this study, only factors that have been identified in the literature of CSA survivors were used, including, 1) eating problems and body image, 2) comfort with intrapersonal closeness, 3) posttraumatic stress disorder, 4) dissociation, 5) affective responses before and after the erotic videos, 6) sexual-self views, 7) sexual satisfaction, 8) sexual function, and 9) sexual attitudes. These variables were hypothesized to inhibit sexual responses by affecting the processing of sexual stimuli. No specific hypotheses were postulated on which variables would show a stronger relationship with the dependent variables.

Evidence coming from studies using priming paradigms (Both,Van Boxtel, Stekelenburg, Everaerd, Laan, 2005) and looking at physiological responses after subliminal exposure to erotic stimuli is in agreement with the "quick and dirty" pathway of emotion formations first proposed by LeDoux (1996). In this pathway, the medulla is a center that becomes activated and projects to the autonomic system independently from

the activity of the frontal cortex. It is plausible that a similar system is activated during sexual arousal and that erotic stimuli may reach the amygdala independently from the activity of the frontal cortex. Thus, impairment in physiological pathways associated with the amygdala that can directly or indirectly affect physiological sexual arousal may be relevant for the sexual response of CSA survivors. Since the literature on trauma survivors points at disruptions in the activity of the amygdala, the HPA axis and the sympathetic nervous system (for a review, see Yehuda, 2003), these impairments were hypothesized to be potential inhibitors of sexual arousal in CSA survivors.

Participants in this study ranged in severity of sexual problems from severe to no problems. Overall, their scores in sexual arousal fell within 1 SD from the mean of women with multiple sexual problems (Wiegel, et al., 2005) and their sexual distress was 2 SD below the average for women with no sexual problems, indicating that, overall, the sample of women studied was experiencing more sexual distress and slightly more sexual problems than women with no sexual problems.

The significant association between problems in sexual arousal function and VPA responses observed in Study 1 were confirmed in Study 2. Levels of sexual arousal function were positively linked to higher VPA responses. Additionally, sexual arousal function was positively associated with a higher correlational coefficient (synchronicity) and steeper slopes (balance) in the VPA/SSA relationship, indicating that the trend observed in Study 1 was an indication of a significant relationship between sexual function and the SSA response in the presence of physiological sexual arousal. Also, SSA scores were significantly related to levels of sexual function. Further evidence of the salience of the VPA/SSA relationship for the sexual function of CSA survivors was provided by the inverse linear relationship between severity of sexual abuse and a weaker balance and synchronicity of the VPA/SSA relationship. These results further support the

hypothesis that some of the inhibitory forces that affect the sexuality of CSA survivors are at play during the sexual responses measured in the laboratory. Of particular interest is the association between VPA/SSA and the severity of the sexual abuse since these results suggest that SSA is more inhibited than VPA.

5.2.1. VPA Predictors

Increments in VPA responses were associated with several predictors derived from the literature on CSA. Specifically, higher VPA responses were associated with lower distancing tendencies (i.e., cognitive, social, and anality, a measure of overall tendency to distance one self from interaction with others), higher positive affect before the erotic video, more conservative sexual attitudes, greater lubrication during sexual interactions, and higher open/direct sexual self-schema and lower embarrassment/ conservatism sexual self-schema scores. Some of these findings are probably not specific to CSA survivors. For example, previous studies on women recruited from the community found higher VPA responses to erotic videos in women with higher positive affect during their daily activities and during the exposure to the erotic video (Heiman, 1977; 1980; Laan, Everaerd, Van Berlo, & Rijs, 1995).

The association between VPA and both sexual self-schemas and sexual attitudes suggests that people's views of sexuality impact their physiological sexual responses. These results provide initial evidence in support of an inhibitory effect of beliefs on VPA. Such interpretation of the results is in agreement with the model proposed by Barlow (1986) which emphasizes the interaction between cognitive expectations and the inhibition of physiological sexual responses observed in men with erectile dysfunction. According to this model, the negative expectations associated with sexual stimuli (for

men, performance anxiety) activate autonomic arousal which increases attention to stimuli associated with the negative expectations. For CSA survivors, it is possible that physiological sexual arousal automatically activates anxiety and this may increase attention to anxiety-provoking stimuli which may lead to an exacerbation of anxiety and a suppression of sexual arousal.

Differently from expected, there was no evidence that severity of PTSD and dissociation symptoms affected VPA. These results are quite surprising since PTSD and dissociation have been linked to impairments in systems shared by sexual arousal such as the sympathetic nervous system. Perhaps, the observed inhibition of VPA was mostly due to cognitive rather than physiological factors. The lack of relationship between sexual responses and psychological distress (i.e., PTSD and dissociation symptoms) is in agreement with prior studies that found impairments in sexual self-schemas and an association between negative affect and sexual concepts in CSA survivors, independently from depression of anxiety symptoms (Meston et al., 2006; Rellini & Meston, 2006). The presence of sexual problems independently from psychological distress could be interpreted as an indication that sexual dysfunction has an etiology separate from psychological problems that follow CSA. Alternatively, it is plausible that CSA survivors who have experienced depression, dissociation or anxiety disorders may have sought and received treatment for these conditions while they may have not felt entitled to ask for help with their sexual distress. Additionally, the professionals treating them may not have had the necessary training to treat sexual dysfunctions. Sex therapy is a specialized and less developed area of psychotherapy and fewer people receive the appropriate training to address these problems. It is also feasible that therapists assessing CSA survivors with sexual problems may be more likely to focus on the trauma rather than directly addressing the sexual problems. Finally, given that the findings in this study point at a

potentially different nature of the sexual problems of CSA survivors compared to non-abused women, it is likely that the common treatments used for female sexual dysfunction may not be effective in CSA survivors. In light of the potential independence between psychological disorders and sexual dysfunction, it would be important to evaluate when sexual dysfunction should be treated when patients present with comorbid psychological problems.

Limitations of the interpretation of these results included the relatively restricted range in levels of dissociation in the sample investigated. Thus, the physiological correlates of dissociation may have been confounded by a lack of range of dissociation. At the same time, the final goal of this study was to inform the development of treatments for sexual dysfunction and women with more severe forms of dissociation may not be good candidates for sex therapy.

Eating disorders and body image did not show a significant relationship with VPA. This is surprising given that the previous literature has identified body image as an important aspect of the sexual problems of CSA survivors (Wenninger & Heiman, 1998). It is possible that factors associated with body image may have not been activated since, in this study, women were alone in a dark private room. It would be interesting to test whether sexual arousal experienced within a sexual interaction with a partner, a situation more likely to activate anxiety provoked by body image, would produce the same results.

The variables that showed an independent and significant association with VPA were cognitive distancing, embarrassment/conservatism sexual self schema and the positive affect reported before the erotic video exposure. These three variables can be interpreted as representations of the woman's approach to dealing with sexual stimuli (cognitive distancing), her view of her sexuality (embarrassment/conservatism) and the positive predisposition towards the sexual stimuli (positive affect before the erotic video).

The valence was negative for two of the factors (cognitive distancing and embarrassment/ conservatism) and positive for the third factor (positive affect) potentially indicating that cognitive distancing and sexual self schemas may have acted as inhibitory factors and that positive affect may have acted as an excitatory factor. Future studies that intend to develop treatments aimed at increasing physiological sexual responses in CSA survivors may benefit from trying to address the balance between these three factors.

5.2.2. SSA Predictors

Given that in Study 1 CSA survivors showed significantly lower SSA responses compared to non-abused women, a greater understanding of SSA predictors may elucidate important aspects of the nature of the subjective experiences of sexual stimuli in CSA survivors. In this study, the variables associated with higher SSA included higher positive affect before the video, an increase in positive affect and a decrease in negative affect during the video, high sexual arousal and orgasm function, and lower intrusive memories.

These results supported the hypothesized positive relationship between sexual arousal and positive affect. Negative affect in response to, or in expectation of, sexual stimuli is a commonly reported phenomenon in a number of studies on CSA survivors (e.g., Meston et al., 1996; Gold, 1986; Heiman et al., 1986; Westerlund, 1992). Overall, women with a history of CSA have shown a greater association between negative affect and sexual words (Meston & Heiman, 2000). In a study on implicit association, CSA survivors showed a lack of association between sexual stimuli and positive valence (pleasure) (Rellini et al., 2007). A more negative sexual self-view and greater positive

affect have been linked to less sexual problems in CSA survivors (Meston et al., 2006; Rellini & Meston, in press).

What remains unexplained is the source of the positive and negative affect associated with pre-video exposure. In this study, positive affect before the erotic video was correlated with less conservative attitudes, open/direct sexual self schemas, and sexual satisfaction. Negative affect reported before the video, on the other hand, was correlated with higher embarrassment/conservatism sexual self-schemas, and severity of dissociation and PTSD symptoms. Thus, two potential sources of negative affect in anticipation of exposure to erotic stimuli included a general sense of distress as identified by higher levels of PTSD and dissociation symptoms, and a negative view of sexuality as indicated by higher conservative sexual attitudes and more conservative sexual self view. Potential treatments developed to increase subjective sexual responses of CSA survivors should address the source of the negative affect or the lack of positive affect experienced in expectation to sexual situations. Other potential sources of negative affect linked to sexual experiences identified in the literature that were not included in the present study include feelings of guilt and shame during sexual arousal (Heiman, Gladue, Roberts, & LoPiccolo, 1986; Westerlund, 1992).

In agreement with studies of sexual self-schemas in women with a history of CSA (Meston et al., 2006), positive sexual self-schemas were related to higher SSA during the erotic video and negative sexual self-schemas showed the opposite pattern. It remains unclear whether sexual self-schemas other than the three measured factors identified by the sexual self-schema scale have a role in the sexual function of women with a history of CSA.

5.2.3. Predictors of VPA/SSA Relationship

One of the hypotheses tested in the present study regards the individual differences that affect the way in which VPA and SSA changed in respect to each other. To elaborate, this study strived to identify potential differences associated with higher or lower SSA scores when women showed a comparable increase in VPA. As for Study 1, the VPA/SSA relationship was operationalized through two coefficients, correlation coefficients were considered an indication of the synchronicity and the HLM coefficients were used as an indication of the balance between VPA and SSA.

The variables that more strongly predicted higher VPA/SSA correlation coefficients (synchronicity) included lower distancing tendencies (i.e., emotional, social, and anality distancing), lower intrusive memories and avoidance symptoms, lower dissociation symptoms (i.e., amnesia, depersonalization, and derealization), higher positive affect before the erotic video, sexual satisfaction, sexual function (desire, arousal, lubrication, orgasm, and satisfaction domains), and lower embarrassment/ conservatism sexual self-schemas. Evidence was found for the hypothesized relationship between the VPA/SSA synchronicity and both sexual self-schemas and the tendency to pursue or distance oneself from interactions (distancing and pursuing variables).

The consistent significant relationship between a number of aspects of sexual function (i.e., desire, arousal, lubrication, orgasm and sexual satisfaction) and the VPA/SSA synchronicity is an indication that the way in which VPA and SSA change in respect to each other is potentially an important aspect of the sexuality of CSA survivors (Wenninger & Heiman, 1998). Specifically, these results show a greater disconnection between mind and body for CSA survivors who experienced more severe sexual problems. These results can be interpreted as evidence for the distancing between mind and body that CSA survivors often report within or outside sexual interactions

(Weiderman & Pryor, 1997). However, no significant relationship was observed between body image and sexual responses, indicating that physiological and subjective sexual responses may be impaired independently of the level of comfort CSA survivors feel with their bodies. Perhaps, what matters the most for the sexuality of CSA survivors is not whether they feel comfortable with their bodies, but rather whether they feel their bodies and their minds are in tune. Different results may be obtained if sexual responses were to be tested during an interaction with a partner when more dysfunctional beliefs about one's body are more likely to be activated.

Dissociation was related with the VPA/SSA relationship. Dissociation is described in the literature as a form of splitting of emotional and/or cognitive processes, a sort of numbing or a psychological escape that has been identified as one of the symptoms of mental illness most directly associated with a history of CSA (Putnam, 1989). Women in the study did not report dissociating during the erotic videos, thus it is particularly interesting to notice that dissociation was a predictor of the VPA/SSA synchronicity. It is important to note that the dissociative scores of the individuals who participated in the study were between low and moderate compared to the clinical population. The fact that, despite the low scores, a significant relationship was observed between dissociation and the VPA/SSA relationship indicating that clinicians treating sexual dysfunctions in CSA survivors should assess dissociation during sexual activities.

The HLM analyses showed a significant association between greater VPA/SSA balance and lower distancing scores (emotional and social), greater pursuing tendencies (communication), lower severity of sexual abuse, higher severity in emotional abuse, greater sexual arousal function and more conservative sexual attitudes.

A greater tendency to pursue interactions with people and emotional experiences may reflect the lack of avoidant symptoms (one of the PTSD symptoms criteria). People

with greater pursuing tendencies may be able to test their dysfunctional beliefs about the world (i.e., the world is dangerous) and others (i.e., others cannot be trusted) and learn not to generalize from their traumatic experiences. In fact, treatments for PTSD and a number of anxiety disorders are based on the concept of breaking the avoidance pattern to increase the opportunity to have correcting experiences. Thereby, women who reported a stronger tendency to pursue interactions are also likely to be open to corrective experiences and consequently may hold less negative views of others and the world. The association between pursuing interactions and greater VPA/SSA relationship may be a marker that women able to maintain a more positive attitude towards others may also be able to have healthier subjective sexual experiences when they feel physically sexually aroused. To the extent that severity of sexual abuse is associated with more impaired views of the relationship with others, women reporting less severe forms of sexual abuse also indicated greater SSA responses in the presence of an increase in VPA.

Women who reported less conservative views of sexuality showed greater SSA scores in the presence of an increase in VPA. It is feasible that women attaching more religious or moral values to sexuality may have experienced the CSA experience as a more severe loss. Feeling damaged or broken may indeed be more common experiences among CSA survivors with more conservative views of sexuality. Also, women with more conservative views of sexuality may be more inclined to feel guilty and shameful of the sexual abuse and these feelings can inhibit the SSA response even in the presence of a VPA response. Conversely, the low VPA/SSA balance for women with more conservative sexual views may not be associated with CSA but may be simply the product of a stronger inhibition in women with such values. Women with more conservative attitudes towards sexuality may either be less likely to experience subjective sexual arousal or may be less likely to report feelings of sexual arousal.

The association between higher emotional abuse and higher SSA in the presence of an increase in VPA is an interesting phenomenon. Subjective sexual arousal is often conceptualized as a complex emotional experience (e.g., Nobre et al., 2004; Rowland, Cooper, & Slob, 1996). It is therefore plausible that women who have experienced emotional abuse may have developed a distorted experience of emotions, emotion regulation, or emotional expression. Further studies investigating the emotional expression of women with a history of emotional abuse are needed to further explain the low SSA response in the presence of an increase in physiological sexual response.

5.2.4. Cortisol

Partial support was found for the hypothesis that women with a history of CSA would respond with a physiological stress response to erotic stimuli. Cortisol activates the metabolism of the organism and makes bodily resources readily available in case of either fight or flight. The redistribution of resources is at the expense of the sexual arousal mechanism since blood carrying oxygen and nutrients is redistributed to muscles and organs necessary for the flight or fight response. Persistent levels of cortisol have a negative effect on the health of the organism since a state of alert cannot be consistently maintained without some damage to the health of the individual.

While no significant changes in cortisol were observed with exposure to the erotic videos when all CSA survivors were considered together, an analysis of individuals' responses showed that while some women showed a decrease in cortisol levels (a response commonly reported in the literature on sexual arousal) a group of women showed a peculiar increase in cortisol. The increase in cortisol was specific to the exposure to the erotic video indicating the appraisal of the sexual stimuli as a stressor.

The appraisal may have occurred at either the automatic or the conscious levels. An interesting interaction was observed between reported levels of dissociation during sexual interaction with a partner and cortisol responses to the erotic video. Women who never or rarely dissociated during sexual activities showed a trend towards a slight reduction in cortisol during exposure to the erotic video. This finding is in agreement with previous studies on cortisol secretion during video induced sexual arousal in women with no history of CSA (Exton, et al., 2000). Conversely, women who reported higher levels of dissociation during sexual activities with their partners showed an increase in cortisol levels which remained high after 30 minutes from the exposure to the erotic stimuli (recovery period).

These results have two main ramifications. The first regards the level of sensitivity of some CSA survivors to the release of cortisol. The presence of an increase in cortisol levels after the simple exposure to an erotic video is an indication of a potentially overactive HPA axis. Cortisol is usually released at times of stress and anxiety and it is therefore not expected during a condition such as a benign exposure to sexual stimuli in a relatively safe environment such as the one offered in the laboratory. The cortisol response was not present before the exposure to the erotic videos, so it cannot be attributed to the anxiety of being in a new and potentially threatening environment like a laboratory. Also, women were not experiencing the threat of having to engage in sexual interaction with a partner or a stranger, therefore we would not expect a sexual video to be a stressor. Perhaps, the release of cortisol after exposure to the erotic videos is a sign of a learned conditioned response to sexual stimuli. It is feasible that women who have had unwanted sexual experiences during childhood may have learned to associate sexual stimuli with anxiety and that this association may be robust to later corrective experiences. Since only a portion of women showed an increase in cortisol levels, it

would be important to conduct further studies to identify the characteristics of this sample of women.

The second ramification of these results regards the use of dissociation during sexual activities. Given that cortisol levels are known to decrease during dissociation when adults are exposed to acute, uncontrollable stress (Morgan III, Hazlett, Wang, Richardson, Schnurr, & Southwick, 2001), it is plausible that CSA survivors who experience distress in sexual situations may have learned to respond with dissociation in these situations. Dissociation may be a functional coping mechanism when the individual faces a stressor that cannot be altered. However, using dissociation in a situation such as a sexual interaction with a trusted partner, may be the sign of potential learned helplessness. Indeed, the literature on animal models of learned helplessness has shown that, in the presence of uncontrollable electrical shocks, rats exhibit a greater release in glucocorticoids as compared to controllable or predictable stress (Weiss, 1968).

The presence of an increased cortisol response further ties into the literature showing large consumptions of alcohol and drugs among CSA survivors before and during sexual interactions. Both human and animal studies on heroine, alcohol and cocaine have shown that corticosterone is normally secreted after the administration of the psychoactive drug (Goeders, 1997; Devries, 1998) and it is associated with an increase in dopamine transmission in the mesocorticolimbic system, a dopamine system that mediates the reward system. Glucocorticosterone increases dopamine in the system by increasing the release, decreasing the metabolism, and decreasing the reuptake of dopamine. Finally, removing glucocorticoids prevents rats from acquiring or maintaining cocaine addiction (Goeders, et al., 1996; 1997). Thus the cortisol secretion observed in some of the participants in this study may be associated with the use of alcohol or other drugs that is commonly noted among CSA survivors.

5.2.5. Conclusions

In women with a history of CSA, sexual arousal problems were associated with weaker VPA, lower overall SSA, and lower synchronicity and balance between VPA and SSA. The linear relationship between VPA and sexual arousal function is a novel and meaningful finding that has not been observed before and increases the validity of the measures of sexual responses collected in the laboratory. Additionally, the results in this study indicated that the potential inhibitory factors that affect the sexual function of CSA survivors are active during laboratory assessment and affect both the physiological and subjective sexual responses of CSA survivors.

The results presented in these studies need to be interpreted within the constraints of the methodological design used. Specifically, this study investigated the sexual responses of CSA survivors outside a dyadic interaction and within the artificial setting of a well-controlled laboratory. While the controlled environment allowed for an in depth exploration of physiological responses that would not be possible to study otherwise, the generalizability to the complex interplay of factors activated within a sexual encounter with a partner may be limited. By isolating the physiological and subjective sexual responses from the complicated interaction of variables that operate in a sexual encounter with a partner, this study was able to provide a more specific description of potential mechanisms activated during exposure to sexual stimuli independent of relational variables.

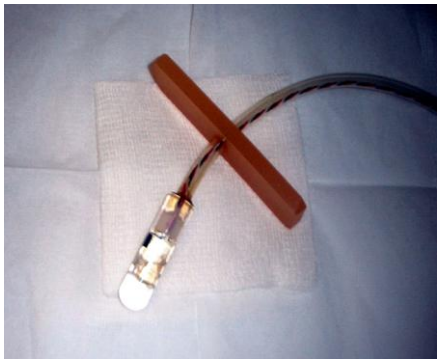
A number of cognitive factors were observed to impact both VPA and SSA. In particular, a recurrent pattern was observed between sexual self schemas, sexual attitudes, and sexual responses. These results underscore the importance of addressing women's beliefs about their sexual self and general sexual beliefs since dysfunctional beliefs were associated with lower physiological and subjective sexual responses. It is feasible that a

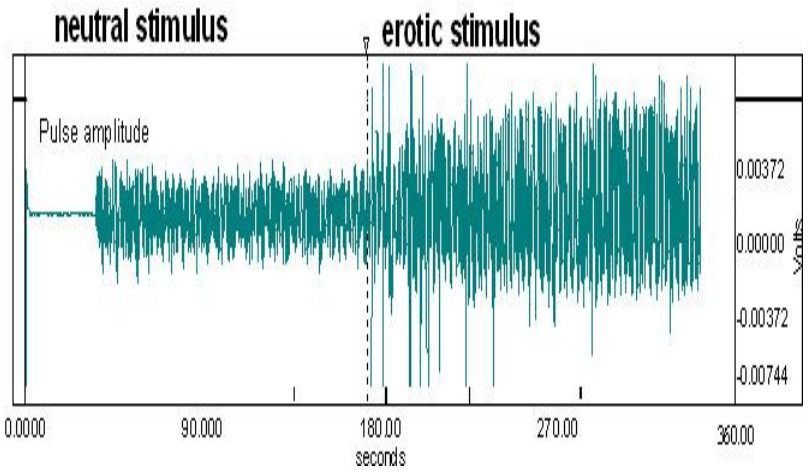
treatment aimed at increasing positive views of the sexual self and the liberal views of sexuality may alleviate the inhibition of both physiological and subjective sexual responses.

The results presented in this study provide further evidence for an impaired physiological reaction to sexual stimuli among CSA survivors. In some of the participants, an increased cortisol level was observed with exposure to sexual stimuli. This surge in cortisol was associated with negative affect before the erotic video and with the self reports of dissociating experiences during sexual activities with a partner. These findings indicate the importance of taking into consideration the potential physiological responses of CSA survivors to erotic stimuli. Women may automatically pair sexual stimuli with a stress response which consequentially may lead to a decreased physiological sexual response. Therefore, it is important for the clinician to know that exclusively addressing the beliefs of a CSA survivor may not be enough to alleviate her sexual distress. Future treatments that integrate both cognitive techniques to address dysfunctional sexual beliefs and behavioral techniques to pair sexual stimuli with positive physical responses may be more effective at addressing the sexual dysfunction of CSA survivors.

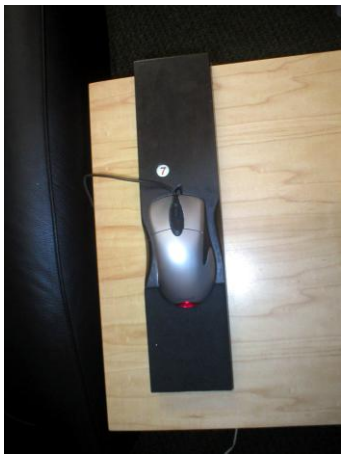
Appendix A - Measures of Female Sexual Arousal

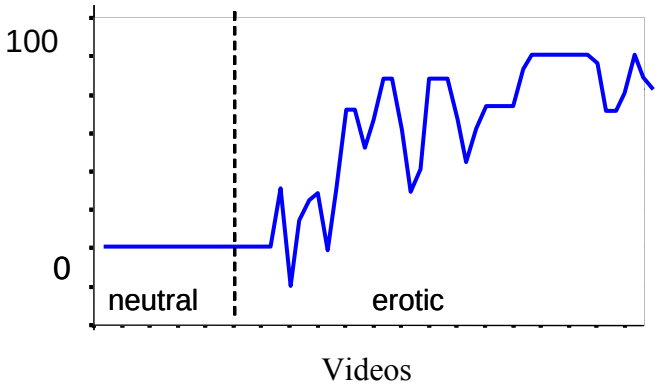
Vaginal Photoplethysmography
The Vaginal Photoplethysmograph and an example of the VPA signal for one participan





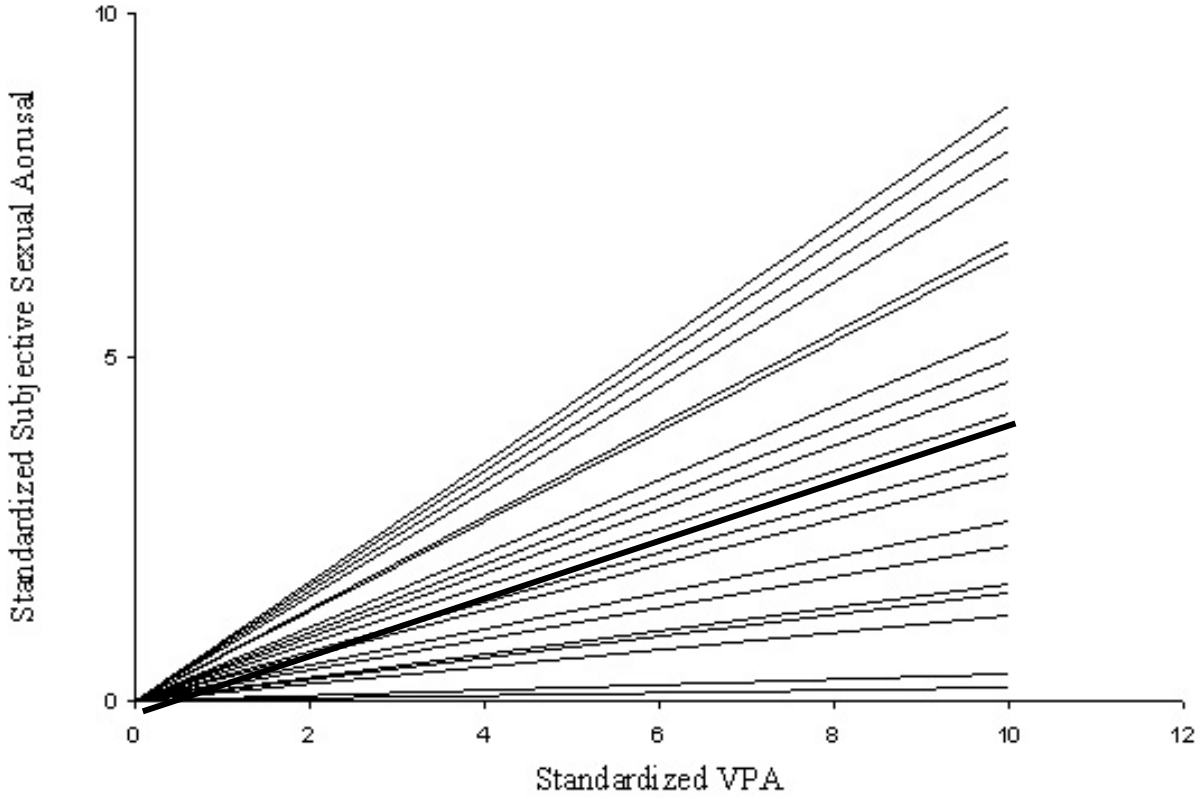
Subjective Sexual Arousal
The arousometer and an example of the SSA signal for one participant





Appendix B

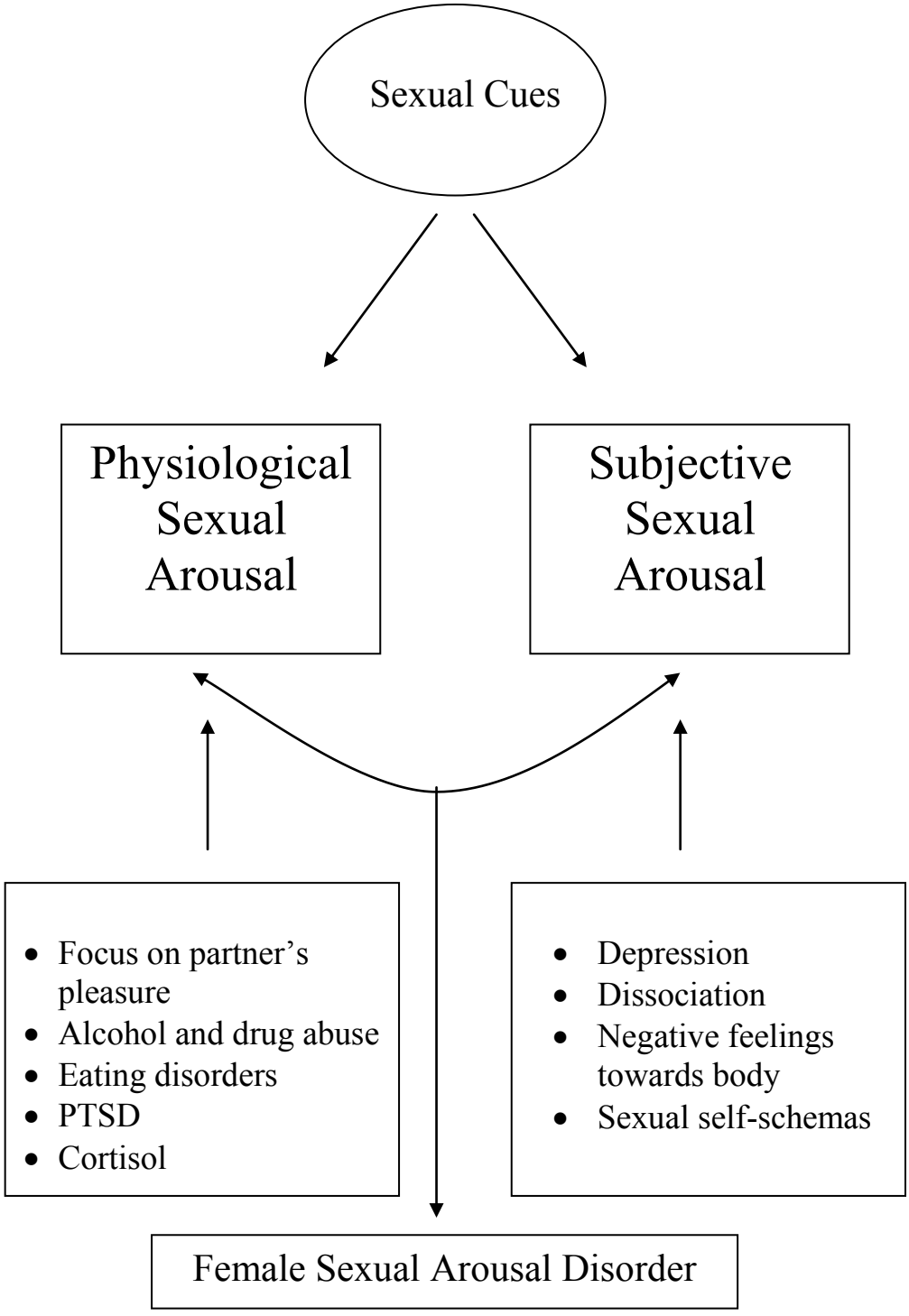
Variance in the strength of the relationship between physiological and subjective sexual arousal



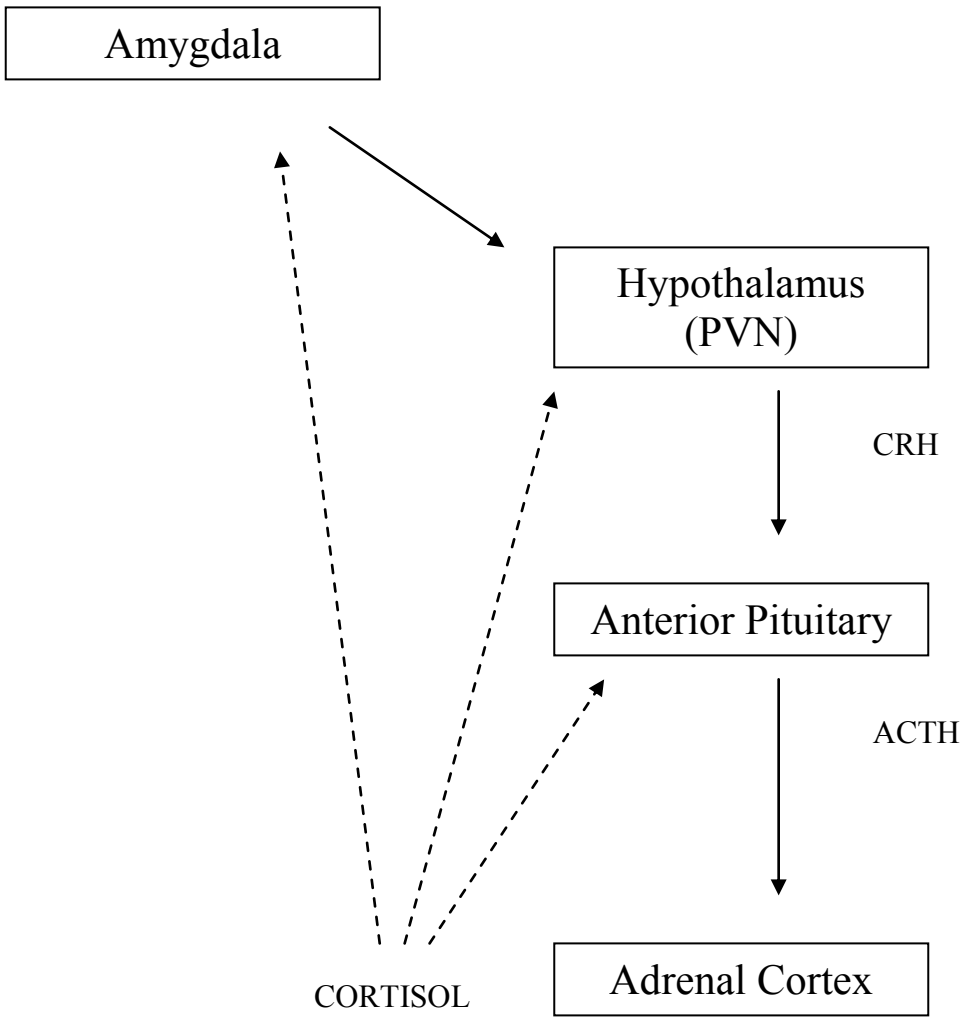
Note: Bold line indicates average slope of the ratio between subjective and physiological sexual arousal.

Appendix C

Bio-psycho-social Model of Moderators of the Relationship Between Physiological and Subjective Sexual Arousal



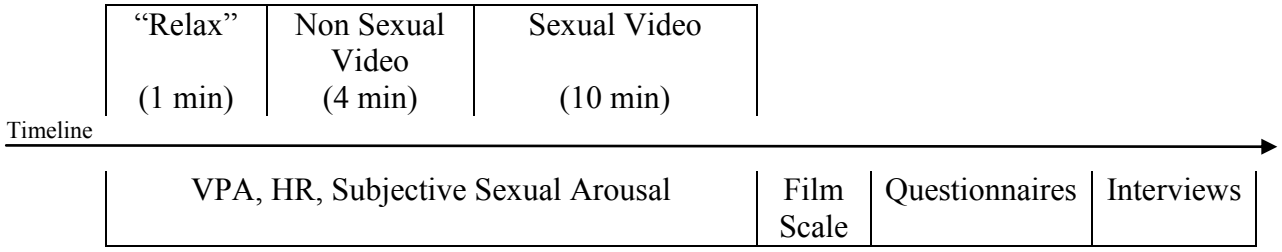
Appendix D - Stress Response



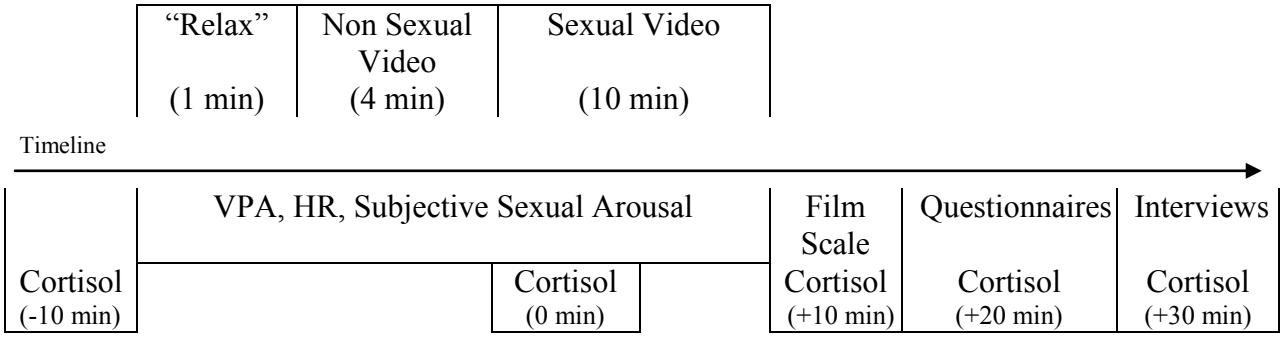
Note: Dotted lines represent inhibitory function of the hormone

Appendix E - Studies' Timelines

Timeline for Study 1



Timeline for Study 2



Appendix F - Schedule of Questionnaires and Measures

Name	Construct	Type	Study 1	Study 2
Vaginal Pulse Amplitude	Physiological sexual arousal	P	✓	✓
Arousometer	Subjective Sexual Arousal	C	✓	✓
Film Scale	Subjective Sexual Arousal	Q	✓	✓
Heart Rate	Sympathetic Activity	P	✓	✓
Cortisol	HPA activity	P		✓
Female Sexual Functioning Index	Sexual Functioning	Q	✓	✓
Sexual Satisfaction Scale - W	Sexual Functioning	Q		✓
Clinician–Administered PTSD Scale	PTSD	I	✓	✓
Childhood Trauma Questionnaire	Trauma History	Q	✓	✓
Child Sexual Abuse Measure	Trauma History	Q	✓	✓
Clinician Administered Dissociative States Scale	Dissociation	I		✓
Bulimic Automatic Thoughts Test	Eating disorders	Q		✓
Eating Attitudes Test	Eating disorders	Q		✓
Alcohol Use Disorders Identification Test	Alcohol abuse	Q		✓
Pursuing-Distancing Scale	Trust and intimacy	Q		✓
Body Esteem	Body esteem	Q		✓
Sexual Attitude Scale	Sexual beliefs	Q		✓
The Sexual Self Schema Scale	Sexual self-schemas	Q		✓
Linguistic Word Count Inquiry	Sexual self-schemas	L		✓

Note: Q: Self reported questionnaire; I: Interview; L: Linguistic analysis; P: Physiological measure; C: continuous measure.

Appendix G - Questionnaires

FILM SCALE

Heiman, J. R., & Rowland, D. L., 1983

Please use the following scale to evaluate how you felt during your film session. Please answer honestly and carefully. On the scale, circle the number which best describes how you felt during the film from 1 (not at all) to 7 (intensely).

During the film, I felt:

	Not at all						Intensely
1. Faster breathing_____	1	2	3	4	5	6	7
2. Faster heart beat_____	1	2	3	4	5	6	7
3. Perspiration _____	1	2	3	4	5	6	7
4. Feelings of warmth_____	1	2	3	4	5	6	7
5. Any physical reaction at all_____	1	2	3	4	5	6	7
6. Breast sensation_____	1	2	3	4	5	6	7
7. Warmth in genitals_____	1	2	3	4	5	6	7
8. Genital wetness or lubrication_____	1	2	3	4	5	6	7
9. Genital pulsing or throbbing_____	1	2	3	4	5	6	7
10. Genital tenseness or tightness_____	1	2	3	4	5	6	7
11. Any genital feeling_____	1	2	3	4	5	6	7
12. Sexually aroused_____	1	2	3	4	5	6	7
13. Sexual desire_____	1	2	3	4	5	6	7
14. Mental sexual arousal_____	1	2	3	4	5	6	7
15. Physical sexual arousal_____	1	2	3	4	5	6	7
16. Worried_____	1	2	3	4	5	6	7
17. Anxious_____	1	2	3	4	5	6	7
18. Angry_____	1	2	3	4	5	6	7
19. Disgusted_____	1	2	3	4	5	6	7
20. Embarrassed_____	1	2	3	4	5	6	7
21. Guilty_____	1	2	3	4	5	6	7
22. Sensuous_____	1	2	3	4	5	6	7
23. A desire to be close to someone____	1	2	3	4	5	6	7

24. Pleasure_____	1	2	3	4	5	6	7
25. Interested_____	1	2	3	4	5	6	7
26. Attracted_____	1	2	3	4	5	6	7
27. Excited_____	1	2	3	4	5	6	7
28. Sexy_____	1	2	3	4	5	6	7
29. Dirty_____	1	2	3	4	5	6	7
30. Loving_____	1	2	3	4	5	6	7
31. Sexually attractive_____	1	2	3	4	5	6	7
32. Inhibited_____	1	2	3	4	5	6	7
33. Easy to arouse_____	1	2	3	4	5	6	7
34. Incompetent_____	1	2	3	4	5	6	7
35. Sexually turned off_____	1	2	3	4	5	6	7
36. Offended_____	1	2	3	4	5	6	7
37. Bored_____	1	2	3	4	5	6	7
38. Feminine_____	1	2	3	4	5	6	7
39. Masculine_____	1	2	3	4	5	6	7
40. Aggressive_____	1	2	3	4	5	6	7
41. Relaxed_____	1	2	3	4	5	6	7

Sexual Satisfaction Scale _ Women (SSS-W)
(Meston & Trapnell, in press)

Using the scale below, please answer the following questions with reference to your current or most recent relationship:

1	**2**	**3**	**4**	**5**
Strongly Disagree	**Slightly Disagree**	**Neither Agree Nor Disagree**	**Slightly Agree**	**Strongly Agree**

___ 1. I feel content with the way my present sex life is.

___ 2. I often feel something is missing from my present sex life.

___ 3. I often feel I don't have enough emotional closeness in my sex life.

___ 4. I feel content with how often I presently have sexual intimacy (kissing, intercourse, etc.) in my life.

___ 5. I don't have *any* important problems or concerns about sex (arousal, orgasm, frequency, compatibility, communication, etc.).

___ 6. Overall, how satisfactory or unsatisfactory is your present sex life? (1 = not at all satisfactory, 2 = not very satisfactory, 3 = reasonably satisfactory, 4 = very satisfactory, 5 = completely satisfactory)

___ 7. My partner often gets defensive when I try discussing sex.

___ 8. My partner and I do not discuss sex openly enough with each other, or do not discuss sex often enough.

___ 9. I usually feel completely comfortable discussing sex whenever my partner wants to.

___ 10. My partner usually feels completely comfortable discussing sex whenever I want to.

___ 11. I have no difficulty talking about my deepest feelings and emotions when my partner wants me to.

___ 12. My partner has no difficulty talking about their deepest feelings and emotions when I want him to.

___ 13. I often feel my partner isn't sensitive or aware enough about my sexual likes and desires.

___ 14. I often feel that my partner and I are not sexually compatible enough.

___ 15. I often feel that my partner's beliefs and attitudes about sex are too different from mine.

___ 16. I sometimes think my partner and I are mismatched in needs and desires concerning sexual intimacy.

___ 17. I sometimes feel that my partner and I might not be physically attracted to each other enough.

___ 18. I sometimes think my partner and I are mismatched in our sexual styles and preferences.

___ 19. I'm worried that my partner will become frustrated with my sexual difficulties.

___ 20. I'm worried that my sexual difficulties will adversely affect my relationship.

___ 21. I'm worried that my partner may have an affair because of my sexual difficulties.

___ 22. I'm worried that my partner is sexually unfulfilled.

___ 23. I'm worried that my partner views me as less of a woman/man because of my sexual difficulties.

___ 24. I feel like I've disappointed my partner by having sexual difficulties.

___ 25. My sexual difficulties are frustrating to me.

___ 26. My sexual difficulties make me feel sexually unfulfilled.

___ 27. I'm worried that my sexual difficulties might cause me to seek sexual fulfillment outside my relationship.

___ 28. I'm so distressed about my sexual difficulties that it affects the way I feel about myself.

___ 29. I'm so distressed about my sexual difficulties that it affects my own well-being.

___ 30. My sexual difficulties annoy and anger me.

MacArthur Salivary Cortisol Protocol

1) How much did you feel happy, excited, or content when you woke up?

❑ Not at all ❑ Somewhat ❑ Very much ❑ Extremely

2) How much did you feel worried, anxious, or fearful when you woke up?

❑ Not at all ❑ Somewhat ❑ Very much ❑ Extremely

3) # of cigarettes smoked today ____

4) # of alcoholic drinks today ___

5) Types drugs or medicines taken and quantity (please include recreational drugs)

Type	Dose
_____	_____

6) Amount of vigorous exercise today

Type _____ Intensity: low mid high Duration ____ Hr _____min

7) Time of awakening ___ : ____

8) the most stressful event of the day

a. time ___ : ___

b. duration ____ hr ____ min

c. degree of stress:

❑ not at all stressed; ❑ somewhat; ❑ moderately; ❑ very stress; ❑ the most stressed I've ever felt

9) How typical was today in terms of how busy

❑ significantly more busy; ❑ somewhat more busy; ❑ pretty much the same; ❑ somewhat less busy; ❑ significantly less busy

10) How much pressure of stress:

❑ significantly more stressed; ❑ somewhat more stressed; ❑ pretty much the same, ❑ somewhat less stressed; ❑ significantly less stressed

Daily Stress

1. Did you have an argument or disagreement with anyone since this time yesterday?	No Yes
2. Since (this time/we spoke) yesterday, did anything happen that you could have argued about but you decided to let pass in order to avoid a disagreement?	No Yes
3. Since (this time/we spoke) yesterday, did anything happen at work or school (other than what you have already mentioned) that most people would consider stressful?	No Yes
4. Since (this time/we spoke) yesterday, did anything happen at home (other than what you have already mentioned) that most people would consider stressful?	No Yes
5. Many people experience discrimination on the basis of such things as race, sex, or age. Did anything like this happen to you since (this time/we spoke) yesterday?	No Yes
6. Since (this time/we spoke) yesterday, did anything happen to a close friend or relative(other than what you have already mentioned) that turned out to be stressful for you?	No Yes
7. Did anything else happen to you since (this time/we spoke) yesterday that most people would consider stressful?	No Yes

Examples of Probes for Description

Ask only if "yes" for following stem questions:

1. Think of the most stressful disagreement or argument you had since (this time/we spoke) yesterday. Who was that with?
2. Think of the most stressful incident of this sort. Who was the person you decided not to argue with?
3. What happened and why did you decide not to get into an argument about it?
4. Think of the most stressful incident of this sort. What was the basis for the discrimination you experienced—your race, sex, age, or something else?

5. Think of the most stressful incident of this sort. Who did this happen to?
6. How does this affect your job?
7. What kinds of things were said?
8. When did that happen? Was that some time yesterday or today?
9. What happened and what about it would most people consider stressful?
10. Have you had any problems with this in the past? All
11. How long has this been going on? All
12. Does this happen often? All
13. Was there anything out of the ordinary in this? All

Subjective Severity Question

1. How stressful was this for you?	very, somewhat, not very, or not at all 1 2 3 4

Primary Appraisal Questions

	a lot, some, a little, or not at all			
	1	2	3	4
How much were the following things at risk in this situation:	1	2	3	4
1. How much did it risk disrupting your daily routine?	1	2	3	4
2. How much did it risk your financial situation?	1	2	3	4
3. How much did it risk the way you feel about yourself?	1	2	3	4
4. How much did it risk the way other people feel about you?	1	2	3	4
5. How much did it risk your physical health or safety?	1	2	3	4
6. How much did it risk the health or well-being of someone you care about?	1	2	3	4
7. How much did it risk your plans for the future?	1	2	3	4

Appendix H: HLM Formulas

$$VPA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$ Equation 1

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

Table H1. Multilevel Regression Estimate for VPA as Predicted by TIME (Time Neutral = 0 – 180; TIME EROTIC = 190 - 680) (Level 1)

	Model 2 VPA = outcome	
Variable	Estimate	s.e.
Fixed effect		
Intercept	3.85	0.332
TIME	0.002	0.000
Random component		
Participant level		
$Var(r_{ij}) = \sigma^2$	0.716	0.846
Group level		
$Var(u_{0j}) = \tau_{00}$	2.051^{***}	4.208
$Var(u_{1j}) = \tau_{11}$	0.000^{***}	0.000
N. parameters	4	
Model deviance	5741.43	

Note. VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$

$$VPA = \beta_{0j} + \beta_{1j}(TIME) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$ Equation 2

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\mathrm{VPA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$ Equation 3

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA) + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA) + u_{1j}$$

$$SSA_{ij} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij}$$ Equation 4

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(CSA)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(CSA)_j + u_{3j}$$

$$VPA_{ij} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$ Equation 5

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(FSFI\_A)_j + \gamma_{03}(CSAxFSFI\_A)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(FSFI\_A)_j + \gamma_{13}(CSAxFSFI\_A)_j + u_{1j}$$

$$VPA_{ij} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$ Equation 6

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(SSS\_W)_j + \gamma_{03}(CSAxSSS\_W)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(SSS\_W)_j + \gamma_{13}(CSAxSSS\_W)_j + u_{1j}$$

$$SSA_{ij} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij}$$

Equation 7

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(FSFI\_A)_j + \gamma_{03}(CSAxFSFI\_A)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(FSFI\_A)_j + \gamma_{13}(CSAxFSFI\_A)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(CSA)_j + \gamma_{22}(FSFI\_A)_j + \gamma_{23}(CSAxFSFI\_A)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(CSA)_j + \gamma_{32}(FSFI\_A)_j + \gamma_{33}(CSAxFSFI\_A)_j + u_{3j}$$

$$SSA_{ij} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij} \quad \text{Equation 8}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(CSA)_j + \gamma_{02}(SSS\_W)_j + \gamma_{03}(CSAxSSS\_W)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(CSA)_j + \gamma_{12}(SSS\_W)_j + \gamma_{13}(CSAxSSS\_W)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(CSA)_j + \gamma_{22}(SSS\_W)_j + \gamma_{23}(CSAxSSS\_W)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(CSA)_j + \gamma_{32}(SSS\_W)_j + \gamma_{33}(CSAxSSS\_W)_j + u_{3j}$$

$$SSA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \quad \text{Equation 9}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + u_{1j}$$

HLM composite model used to estimate VPA

$$VPA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \quad \text{Equation 10}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(COG\_DIST)_j + \gamma_{02}(PV\_POS\_AFF)_j + \gamma_{03}(EMB)_j + \gamma_{04}(SSS\_W)_j + \gamma_{05}(SAS)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(COG\_DIST)_j + \gamma_{12}(PV\_POS\_AFF)_j + \gamma_{13}(EMB)_j + \gamma_{14}(SSS\_W)_j + \gamma_{15}(SAS)_j + u_{1j}$$

Note: COG_DIST= cognitive distancing; PV_POS_AFF = pre-video positive affect; EMB= embarrassment/conservatism; SSS_W= sexual satisfaction total score; SAS= sexual attitude scale

HLM composite model used to estimate SSA

Equation 11

$$SSA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(FSFI\_A)_j + \gamma_{02}(ANAL\_PUR)_j + \gamma_{03}(RE{-}EXP)_j + \gamma_{04}(OPEN)_j + \gamma_{05}(SAS)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(FSFI\_A)_j + \gamma_{12}(ANAL\_PUR)_j + \gamma_{13}(RE{-}EXP)_j + \gamma_{14}(OPEN)_j + \gamma_{15}(SAS)_j + u_{1j}$$

Note: FSFI_A= female sexual arousal function; ANAL_PUR= anality pursuing; RE-EXP = re-experiencing PTSD symptoms; OPEN = open/direct sexual self-schema; SAS= sexual attitude scale

HLM composite model for SSA estimated by VPA, VIDEO, and VPAxVIDEO

Equation 12

$$SSA_{ij} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VPAxVIDEO) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(EM\_D)_j + \gamma_{02}(CO\_D)_j + \gamma_{03}(SEX)_j + \gamma_{04}(EM) + \gamma_{05}(FSFI\_A)_j + \gamma_{06}(SAS)_j + {}_j u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(EM\_D)_j + \gamma_{12}(CO\_D)_j + \gamma_{13}(SEX)_j + \gamma_{14}(EM) + \gamma_{15}(FSFI\_A)_j + \gamma_{16}(SAS)_j + {}_j u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(EM\_D)_j + \gamma_{22}(CO\_D)_j + \gamma_{23}(SEX)_j + \gamma_{24}(EM) + \gamma_{25}(FSFI\_A)_j + \gamma_{26}(SAS)_j + {}_j u_{2j}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(EM\_D)_j + \gamma_{32}(CO\_D)_j + \gamma_{33}(SEX)_j + \gamma_{34}(EM) + \gamma_{35}(FSFI\_A)_j + \gamma_{36}(SAS)_j + {}_j u_{3j}$$

Note: EM_D= emotional distancing; CO_D= communication distancing; SEX= sex abuse; EM = emotional abuse; FSFI_A= female sexual arousal function; SAS= sexual attitude scale.

Appendix I: HLM Analyses

Table 1. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and Dissociation Symptoms (Amnesia, Depersonification, and Derealization) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	0.972	0.654	2.333***	0.223
AMNESIA	-0.059	0.414	-0.100	0.133
DEPERSONIFICATION (DP)	-0.015	0.182	0.044	0.093
DEREALIZATION (DR)	0.075	0.112	0.011	0.056
VIDEO	44.011***	4.278	1.322***	0.350
VIDEO x AMNESIA	-6.641***	1.710	-0.088	0.138
VIDEO x (DP)	1.739	1.139	-0.120	0.103
VIDEO x (DR)	0.424	1.024	0.070	0.092
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.672	23.123	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.960	0.980	1.335***	1.156
$Var(u_{1j}) = \tau_{11}$	308.246***	17.557	2.009***	1.418
N. parameters	4		4	
Model deviance	23761.287		6799.187	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; CSA = child sexual abuse history; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(AMNESIA)_j + \gamma_{02}(DEPERSONIFICATION)_j + \gamma_{03}(DEREALIZATION)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(AMNESIA)_j + \gamma_{12}(DEPERSONIFICATION)_j + \gamma_{13}(DEREALIZATION)_j + u_{1j}$$

Equation 1

$$VPA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(AMNESIA)_j + \gamma_{02}(DEPERSONIFICATION)_j + \gamma_{03}(DEREALIZATION)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(AMNESIA)_j + \gamma_{12}(DEPERSONIFICATION)_j + \gamma_{13}(DEREALIZATION)_j + u_{1j}$$

Equation 2

Table 2. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) (Level 1), and by Dissociation Symptoms (Amnesia, Depersonification, and Derealization) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-0.439	1.422	-37.104*	15.640
AMNESIA	-0.692	0.631	5.779	6.047
DEPERSONIFICATION (DP)	-0.022	0.335	-0.515	4.455
DEREALIZATION (DR)	-0.398	0.224	0.027	3.079
VPA	0.693	0.540	28.296***	7.723
VPA x AMNESIA	0.364	0.269	-3.813†	1.989
VPA x (DP)	-0.086	0.121	0.417	1.932
VPA x (DR)	0.200*	0.086	0.195	1.517
VIDEO	-36.865*	15.104	31.377*	13.692
VIDEO x AMNESIA	6.538	5.643	-5.631	5.577
VIDEO x (DP)	-0.485	4.276	-0.286	4.014
VIDEO x (DR)	0.418	2.978	0.132	2.714
(VIDEO x VPA)	27.634***	7.391	-24.847***	6.420
(VIDEO x VPA) x AMNESIA	-4.193*	1.819	3.724*	1.610
(VIDEO x VPA) x (DP)	0.499	1.857	-0.209	1.598
(VIDEO x VPA) x (DR)	-0.002	1.465	-0.167	1.258
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	387.396	19.682	387.644	19.689
Group level				
$Var(u_{0j}) = \tau_{00}$	9.412	3.068	4983.600***	70.595
$Var(u_{1j}) = \tau_{11}$	2.213	1.488	1127.707***	33.581
$Var(u_{0j}) = \tau_{22}$	4672.022	68.352	3808.453	61.713
$Var(u_{1j}) = \tau_{33}$	1052.910	32.449	765.647	27.670
N. parameters	11		11	
Model deviance	23074.907		23076.150	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; CSA = child sexual abuse history; DP = Depresonification; DR = Derealization; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij} \quad \text{Equation 3}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(AMNESIA)_j + \gamma_{02}(DEPERSONIFICATION)_j + \gamma_{03}(DEREALIZATION)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(AMNESIA)_j + \gamma_{12}(DEPERSONIFICATION)_j + \gamma_{13}(DEREALIZATION)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(AMNESIA)_j + \gamma_{22}(DEPERSONIFICATION)_j + \gamma_{23}(DEREALIZATION)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(AMNESIA)_j + \gamma_{32}(DEPERSONIFICATION)_j + \gamma_{33}(DEREALIZATION)_j + u_{3j}$$

Table 3. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by PTSD Symptoms (Re-experiencing, Avoidance, Hyperarousability) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-0.057	0.651	2.381***	0.302
REEXPER	0.487	0.426	-0.063	0.123
AVOID	0.364	0.329	-0.044	0.091
HYPER	-0.073	0.345	0.123	0.140
VIDEO	48.696***	5.236	1.472*	0.560
VIDEO x REEXPER	-6.259***	1.812	-0.070	0.154
VIDEO x AVOID	3.219	1.871	-0.088	0.079
VIDEO x HYPER	-1.952	2.802	-0.060	0.254
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.260	23.114	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	1.384	1.176	1.361***	1.167
$Var(u_{1j}) = \tau_{11}$	340.20***	18.444	2.028***	1.424
N. parameters	4		4	
Model deviance	23754.336		6792.221	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; REEXPER = re-experiencing symptoms, AVOID = avoidance of symptoms, HYPER = hyperarousability symptoms. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(REEXPER)_j + \gamma_{02}(AVOID)_j + \gamma_{03}(HYPER)_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(REEXPER)_j + \gamma_{12}(AVOID)_j + \gamma_{13}(HYPER)_j + u_{1j}$$

Equation 4

$$\text{VPA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$

Equation 5

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(REEXPER)_j + \gamma_{02}(AVOID)_j + \gamma_{03}(HYPER)_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(REEXPER)_j + \gamma_{12}(AVOID)_j + \gamma_{13}(HYPER)_j + u_{1j}$$

Table 4. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VPA x VIDEO (Level 1), and by PTSD Symptoms Re-experiencing, Avoidance, Hyperarousability) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-2.231	1.521	-37.990	21.720
REEXPER	0.447	1.337	5.977	10.151
AVOID	-0.402	0.487	6.355	8.150
HYPER	-0.138	1.028	-8.428	10.930
VPA	1.004	0.668	28.649**	10.359
VPA X REEXPER	0.018	0.558	-3.690	4.843
VPA X AVOID	0.348	0.305	-2.115	3.930
VPA X HYPER	-0.003	0.421	3.676	5.187
VIDEO	-36.503	20.620	31.763	19.538
VIDEO x REEXPER	5.576	10.022	-4.702	9.309
VIDEO x AVOID	7.017	7.330	-5.790	7.374
VIDEO x HYPER	-8.383	10.879	6.284	9.901
VIDEO x VPA	27.922**	10.078	25.429**	8.583
(VIDEO x VPA) x (REEXPER)	-3.722	4.871	3.289	4.101
(VIDEO x VPA) x (AVOID)	-2.586	2.990	1.839	3.313
(VIDEO x VPA) x (HYPER)	3.736	5.402	-2.534	4.339
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	387.229	19.678	387.502	19.685
Group level				
$Var(u_{0j}) = \tau_{00}$	4.533	2.129	4920.133***	70.144
$Var(u_{1j}) = \tau_{11}$	2.054	1.433	1129.996***	33.615
$Var(u_{0j}) = \tau_{22}$	4709.494	68.626	3819.144	61.799
$Var(u_{1j}) = \tau_{33}$	1052.382	32.440	748.295	27.355
N. parameters	11		11	
Model deviance	23055.600		23057.04	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; REEXPER = re-experiencing symptoms, AVOID = avoidance of symptoms, HYPER = hyperarousability symptoms.. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

Equation 6

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(REEXP)_j + \gamma_{02}(AVOID)_j + \gamma_{03}(HYPER)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(REEXP)_j + \gamma_{12}(AVOID)_j + \gamma_{13}(HYPER)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(REEXP)_j + \gamma_{22}(AVOID)_j + \gamma_{23}(HYPER)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(REEXP)_j + \gamma_{32}(AVOID)_j + \gamma_{33}(HYPER)_j + u_{3j}$$

Table 5. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Physical Abuse (PA), Sexual Abuse (SA), and Emotional Abuse (EA) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	2.068	1.872	2.377**	0.577
PHYSICAL ABUSE (PA)	-0.014	0.065	0.00	0.04
SEXUAL ABUSE (SA)	-0.015	0.068	-0.02	0.03
EMOTIONAL ABUSE (EA)	-0.033	0.086	0.01	0.04
VIDEO	58.242***	11.607	0.71	0.508
VIDEO x PA	-0.573	0.863	0.00	0.040
VIDEO x SA	0.419	0.525	0.02	0.037
VIDEO x EA	-0.508	0.840	-0.00	0.038
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	619.990	24.900	0.797	0.893
Group level				
$Var(u_{0j}) = \tau_{00}$	1.192	1.092	1.519**	1.233
$Var(u_{1j}) = \tau_{11}$	361.543***	19.014	2.327***	1.526
N. parameters	4		4	
Model deviance	19119.847		5613.709	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} SSA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(PA)_j + \gamma_{02}(SA)_j + \gamma_{03}(EA)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(PA)_j + \gamma_{12}(SA)_j + \gamma_{13}(EA)_j + u_{1j} \end{aligned}$$

Equation 7

$$\begin{aligned} VPA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(PA)_j + \gamma_{02}(SA)_j + \gamma_{03}(EA)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(PA)_j + \gamma_{12}(SA)_j + \gamma_{13}(EA)_j + u_{1j} \end{aligned}$$

Equation 8

Table 6. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VPA x VIDEO (Level 1), and by Physical Abuse (PA), Sexual Abuse (SA), and Emotional Abuse (EA) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	1.073	3.296	-54.218*	22.528
PHYSICAL ABUSE (PA)	-0.319†	0.165	1.783	1.795
SEXUAL ABUSE (SA)	0.601***	0.126	7.910***	2.027
EMOTIONAL ABUSE (EA)	-0.665**	0.207	-8.857***	2.254
VPA	0.390	1.607	41.075**	13.346
VPA x PA	0.141	0.098	-1.279	0.835
VPA x SA	-0.322***	0.054	-3.396**	1.081
VPA x EA	0.333**	0.105	3.974**	1.282
VIDEO	-55.235*	22.032	52.240*	20.228
VIDEO x PA	2.083	1.811	-1.914	1.750
VIDEO x SA	7.357**	2.029	-7.001***	1.851
VIDEO x EA	-8.234***	2.166	7.584***	1.968
VIDEO x VPA	40.677**	12.346	-38.725**	10.748
(VIDEO x VPA) x (PA)	-1.409	0.796	1.307	0.697
(VIDEO x VPA) x (SA)	-3.102**	1.055	2.882**	0.932
(VIDEO x VPA) x (EA)	3.663**	1.213	-3.304**	1.059
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	449.228	21.195	449.314	21.197
Group level				
$Var(u_{0j}) = \tau_{00}$	1.761	1.327	1926.591***	43.893
$Var(u_{1j}) = \tau_{11}$	1.579	1.257	546.490***	23.377
$Var(u_{0j}) = \tau_{22}$	1872.337	43.271	1623.181	40.289
$Var(u_{1j}) = \tau_{33}$	496.815	22.289	360.135	18.978
N. parameters	11		11	
Model deviance	18551.261		18551.651	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
† p <. 07, * $p < .05$, ** $p < .01$, *** $p < .001$.

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$ Equation 9

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(PA)_j + \gamma_{02}(SA)_j + \gamma_{03}(EA)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(PA)_j + \gamma_{12}(SA)_j + \gamma_{13}(EA)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(PA)_j + \gamma_{22}(SA)_j + \gamma_{23}(EA)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(PA)_j + \gamma_{32}(SA)_j + \gamma_{33}(EA)_j + u_{3j}$$

Table 7. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Body Image Factors (Sexual Attractiveness, Weight Concern, and Physical Condition) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	1.119	1.649	2.074*	0.815
SEXUAL ATTRACTIVENESS (SA)	0.052	0.049	0.004	0.023
WEIGHT CONCERNS (WC)	-0.065	0.066	0.023	0.035
PHYSICAL CONDITION (PC)	-0.026	0.061	-0.015	0.031
VIDEO	20.170	17.685	0.250	0.984
VIDEO x (SA)	0.192	0.345	-0.008	0.031
VIDEO x (WC)	-0.518	0.582	-0.025	0.046
VIDEO x (PC)	1.080	0.592	0.068	0.078
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.606	23.122	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.890	0.944	1.364***	1.168
$Var(u_{1j}) = \tau_{11}$	393.330***	19.833	1.981***	1.407
N. parameters	4		4	
Model deviance	23777.795		6809.870	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} SSA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SA)_j + \gamma_{02}(WC)_j + \gamma_{03}(PC)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SA)_j + \gamma_{12}(WC)_j + \gamma_{13}(PC)_j + u_{1j} \end{aligned}$$

Equation 10

$$VPA = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$

$$\begin{aligned} \beta_{0j} &= \gamma_{00} + \gamma_{01}(SA)_j + \gamma_{02}(WC)_j + \gamma_{03}(PC)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SA)_j + \gamma_{12}(WC)_j + \gamma_{13}(PC)_j + u_{1j} \end{aligned}$$

Equation 11

Table 8. Multilevel Regression Estimate for SSA as Predicted by VPA and VIDEO (Erotic = 0; Neutral = 1) (Level 1), (VIDEO x VPA) (Level 1), and by Body Image Factors (Sexual Attractiveness, Weight Concerns, and Physical Condition) (Level 2)

	Erotic = 0	
Variable	Estimate	s.e.
Fixed effect		
Intercept	78.849	71.465
SEXUAL ATTRACTIVENESS (SA)	-2.112	1.732
WEIGHT CONCERNS (WC)	3.257	2.389
PHYSICAL CONDITION (PC)	-3.554	2.583
VPA	-24.543	36.474
VPA x (SA)	1.009	0.869
VPA x (WC)	-1.715	1.200
VPA x (PC)	1.771	1.362
VIDEO	-83.514	62.788
VIDEO x (SA)	2.091	1.544
VIDEO x (WC)	-2.822	1.985
VIDEO x (PC)	3.106	2.170
(VIDEO x VPA)	27.716	30.242
(VIDEO x VPA) x (SA)	-0.969	0.728
(VIDEO x VPA) x (WC)	1.418	0.951
(VIDEO x VPA) x (PC)	-1.529	1.103
Random component		
Participant level		
$Var(r_{ij}) = \sigma^2$	387.699	19.690
Group level		
$Var(u_{0j}) = \tau_{00}$	4416.551***	66.457
$Var(u_{1j}) = \tau_{11}$	985.583***	31.394
$Var(u_{0j}) = \tau_{22}$	3472.485	58.928
$Var(u_{1j}) = \tau_{33}$	659.644	25.684
N. parameters	11	
Model deviance	23092.963	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

Equation 12

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SA)_j + \gamma_{02}(WC)_j + \gamma_{03}(PC)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(SA)_j + \gamma_{12}(WC)_j + \gamma_{13}(PC)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(SA)_j + \gamma_{22}(WC)_j + \gamma_{23}(PC)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(SA)_j + \gamma_{32}(WC)_j + \gamma_{33}(PC)_j + u_{3j}$$

Table 9. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by DISTANCING Factors (Cognitive, Emotional, Social, Communication, Sensations, and Anality) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	1.338	2.419	3.665***	0.613
COGNITIVE (COG)	0.277	0.582	0.051	0.125
EMOTIONAL (EMOT)	-0.341	0.576	-0.140	0.143
SOCIAL (SOC)	-0.007	0.311	-0.120	0.091
COMMUNICATION (COM)	0.225	0.454	-0.082	0.082
SENSATIONS (SENS)	0.437	0.612	0.079	0.207
ANALITY (ANAL)	-0.876	0.563	-0.224†	0.113
VIDEO		13.901	3.137**	0.855
VIDEO x COG	3.233	3.503	-0.430*	0.204
VIDEO x EMOT	0.035	3.857	-0.151	0.187
VIDEO x SOC	-0.726	2.281	-0.070	0.123
VIDEO x COM	0.039	1.177	0.018	0.123
VIDEO x SENS	5.572	3.545	0.386	0.280
VIDEO x ANAL	-2.185	3.781	-0.658*	0.291
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	600.384	24.503	0.760	0.872
Group level				
$Var(u_{0j}) = \tau_{00}$	0.273	0.522	1.195***	1.093
$Var(u_{1j}) = \tau_{11}$	410.710***	20.266	1.390***	1.179
$Var(u_{0j}) = \tau_{22}$				
$Var(u_{1j}) = \tau_{33}$				
N. parameters	4		4	
Model deviance	20445.912		5902.930	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(COG)_j + \gamma_{02}(EMOT)_j + \gamma_{03}(SOC)_j + \gamma_{04}(COM)_j + \gamma_{05}(SENS)_j + \gamma_{06}(ANAL)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(COG)_j + \gamma_{12}(EMOT)_j + \gamma_{13}(SOC)_j + \gamma_{14}(COM)_j + \gamma_{15}(SENS)_j + \gamma_{16}(ANAL)_j + u_{1j}$$

Equation 13

$$\text{VPA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(COG)_j + \gamma_{02}(EMOT)_j + \gamma_{03}(SOC)_j + \gamma_{04}(COM)_j + \gamma_{05}(SENS)_j + \gamma_{06}(ANAL)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(COG)_j + \gamma_{12}(EMOT)_j + \gamma_{13}(SOC)_j + \gamma_{14}(COM)_j + \gamma_{15}(SENS)_j + \gamma_{16}(ANAL)_j + u_{1j}$$

Equation 14

Table 10. Multilevel Regression Estimate for SSA as Predicted by VPA and VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) (Level 1), and by (VPA x VIDEO) (Level 1), and by DISTANCING Factors (Cognitive, Emotional, Social, Communication, Sensations, and Anality) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-4.709	4.571	-14.728	70.057
COGNITIVE (COG)	-0.924	1.083	-6.667	15.849
EMOTIONAL (EMOT)	3.648**	1.000	12.954	18.634
SOCIAL (SOC)	3.254***	0.471	14.253	10.353
COMMUNICATION (COM)	-4.675***	0.772	-10.285	11.893
SENSATIONS (SENS)	2.122	1.172	-6.775	16.218
ANALITY (ANAL)	-2.310*	1.067	-17.784	18.158
VPA	0.824	1.712	-4.216	31.078
VPA x COG	0.846	0.585	4.044	7.009
VPA x EMOT	-1.772***	0.439	-4.478	8.302
VPA x SOC	-1.345***	0.177	-6.653	4.509
VPA x COM	2.294***	0.353	8.346	5.251
VPA x SENS	-0.950	0.506	3.395	7.053
VPA x ANAL	0.972*	0.501	10.855	8.079
VIDEO	-33.843	55.010	16.069	64.592
VIDEO x COG	-2.621	8.965	2.355	14.799
VIDEO x EMOT	12.706	14.925	-12.096	17.773
VIDEO x SOC	7.765	10.554	-8.722	9.605
VIDEO x COM	-4.661	10.878	7.166	11.377
VIDEO x SENS	-6.798	10.526	7.061	14.980
VIDEO x ANAL	-5.126	21.422	11.979	17.021
VIDEO x VPA	2.642	25.074	1.443	25.993
(VIDEO x VPA) x (COG)	2.635	4.545	-1.561	6.024
(VIDEO x VPA) x (EMOT)	-3.598	7.000	4.237	7.417
(VIDEO x VPA) x (SOC)	-3.110	4.450	4.012	3.813
(VIDEO x VPA) x (COM)	4.378	4.947	-6.778	4.714
(VIDEO x VPA) x (SENS)	4.286	5.532	-2.971	5.949
(VIDEO x VPA) x (ANAL)	4.418	9.685	-8.151	6.963
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	432.728	20.802	94	21.208
Group level				
$Var(u_{0j}) = \tau_{00}$	2.600	1.612	5923.773***	76.966
$Var(u_{1j}) = \tau_{11}$	1.621	1.273	1157.490***	34.022
$Var(u_{0j}) = \tau_{22}$	5934.660	77.037	4827.660	69.481
$Var(u_{1j}) = \tau_{33}$	1239.024	35.200	766.041	27.677
N. parameters	11		11	
Model deviance	19796.382		18478.992	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; CSA = child sexual abuse history. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

*$p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(COG)_j + \gamma_{02}(EMOT)_j + \gamma_{03}(SOC)_j + \gamma_{04}(COM)_j + \gamma_{05}(SENS)_j + \gamma_{06}(ANAL)_j + u_{1j} \quad \text{Equation 15}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(COG)_j + \gamma_{12}(EMOT)_j + \gamma_{13}(SOC)_j + \gamma_{14}(COM)_j + \gamma_{15}(SENS)_j + \gamma_{16}(ANAL)_j + u_{2j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(COG)_j + \gamma_{22}(EMOT)_j + \gamma_{23}(SOC)_j + \gamma_{24}(COM)_j + \gamma_{25}(SENS)_j + \gamma_{26}(ANAL)_j + u_{3j}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(COG)_j + \gamma_{32}(EMOT)_j + \gamma_{33}(SOC)_j + \gamma_{34}(COM)_j + \gamma_{35}(SENS)_j + \gamma_{36}(ANAL)_j + u_{4j}$$

Table 11. Multilevel Regression Estimate for SSA as Predicted by VPA and VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) (Level 1), and by (VPA x VIDEO) (Level 1), and by PURSUING Factors (Cognitive, Emotional, Social, Communication, Sensations, and Anality) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-6.739	5.818	-100.563	82.975
COGNITIVE (COG)	-0.676	0.992	11.181	11.121
EMOTIONAL (EMOT)	4.701	1.847	13.760	12.570
SOCIAL (SOC)	-3.627	1.017	-13.388	11.276
COMMUNICATION (COM)	1.911	0.685	-3.000	6.770
SENSATIONS (SENS)	-2.817	1.437	15.234	14.342
ANALITY (ANAL)	1.170	0.990	15.474	15.150
VPA	7.719*	2.959	79.853*	38.574
VPA x COG	0.089	0.516	2.188	4.550
VPA x EMOT	-2.23*	0.899	0.854	7.147
VPA x SOC	1.892***	0.511	4.404	5.221
VPA x COM	-1.155**	0.371	-5.206	3.490
VPA x SENS	0.402	0.658	-10.177	6.469
VPA x ANAL	-0.513	0.497	-5.807	7.364
VIDEO	-94.164	78.434	65.145	69.654
VIDEO x COG	11.426	10.665	-11.725	9.892
VIDEO x EMOT	8.889	11.761	-6.217	10.385
VIDEO x SOC	-9.837	10.728	7.244	9.572
VIDEO x COM	-4.579	6.468	6.413	5.845
VIDEO x SENS	18.174	13.625	-14.939	12.465
VIDEO x ANAL	14.251	14.466	-11.673	12.837
VIDEO x VPA	72.360†	36.336	-56.580	30.732
(VIDEO x VPA) x (COG)	2.324	4.327	-1.942	3.721
(VIDEO x VPA) x (EMOT)	3.172	6.616	-4.037	5.470
(VIDEO x VPA) x (SOC)	2.538	4.909	-1.352	4.150
(VIDEO x VPA) x (COM)	-4.225	3.288	3.136	2.810
(VIDEO x VPA) x (SENS)	-10.619	6.103	8.652	5.290
(VIDEO x VPA) x (ANAL)	-5.273	6.964	3.846	5.909
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	432.766	20.803	433.045	20.810
Group level				
$Var(u_{0j}) = \tau_{00}$	17.805	4.220	5763.900***	75.920
$Var(u_{1j}) = \tau_{11}$	5.166	2.273	1246.010***	35.299
$Var(u_{0j}) = \tau_{22}$	5311.88	72.883	4175.701	64.620
$Var(u_{1j}) = \tau_{33}$	1117.928	33.435	768.911	27.729
N. parameters	11		11	
Model deviance	19789.38		19790.494	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; CSA = child sexual abuse history; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- † $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

Equation 16

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(COG)_j + \gamma_{02}(EMOT)_j + \gamma_{03}(SOC)_j + \gamma_{04}(COM)_j + \gamma_{05}(SENS)_j + \gamma_{06}(ANAL)_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(COG)_j + \gamma_{12}(EMOT)_j + \gamma_{13}(SOC)_j + \gamma_{14}(COM)_j + \gamma_{15}(SENS)_j + \gamma_{16}(ANAL)_j + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(COG)_j + \gamma_{22}(EMOT)_j + \gamma_{23}(SOC)_j + \gamma_{24}(COM)_j + \gamma_{25}(SENS)_j + \gamma_{26}(ANAL)_j + u_{2j}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(COG)_j + \gamma_{32}(EMOT)_j + \gamma_{33}(SOC)_j + \gamma_{34}(COM)_j + \gamma_{35}(SENS)_j + \gamma_{36}(ANAL)_j + u_{3j}$$

Table 12. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0)(Level 1), and by the Sexual Self-Schemas Scale Factors (Romantic/Passionate, Open/Direct, Embarrassed/Inhibited) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	4.472	3.859	0.814	1.131
ROMANTIC	-0.030	0.063	0.020	0.022
OPEN	-0.043	0.063	0.030	0.024
EMBARRASSED	-0.011	0.043	-0.031	0.023
VIDEO	87.129***	22.760	2.121	1.508
VIDEO x ROMANTIC	0.586	0.350	-0.016	0.029
VIDEO x OPEN	-1.168**	0.368	0.024	0.020
VIDEO x EMBARRASSED	-1.320**	0.428	-0.080*	0.032
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.692	23.123	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.733	0.856	1.141***	1.068
$Var(u_{1j}) = \tau_{11}$	345.225***	18.580	1.640***	1.281
N. parameters	4		4	
Model deviance	23774.816		6802.080	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; ROMANTIC = romantic/passionate SSSS factor, OPEN = open/direct SSSS factor, and EMBARRASSED = embarrassed/inhibited SSSS factor. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \qquad \text{Equation 17}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(ROMANTIC)_j + \gamma_{02}(OPEN)_j + \gamma_{03}(EMBARRASSED)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(ROMANTIC)_j + \gamma_{12}(OPEN)_j + \gamma_{13}(EMBARRASSED)_j + u_{1j}$$

$$\text{VPA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \qquad \text{Equation 18}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(ROMANTIC)_j + \gamma_{02}(OPEN)_j + \gamma_{03}(EMBARRASSED)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(ROMANTIC)_j + \gamma_{12}(OPEN)_j + \gamma_{13}(EMBARRASSED)_j + u_{1j}$$

Table 13. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VPA x VIDEO (Level 1), and by Sexual Self Schema Scale Factors (Romantic/Passionate, Open/Direct, Embarrassed/Inhibited) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-15.294*	7.501	18.372	93.365
ROMANTIC	0.119	0.160	-1.82(	1.728
OPEN	0.113	0.103	0.32:	1.759
EMBARRASSED	0.165	0.109	1.18{	1.964
VPA	10.044*	4.463	34.30{	45.289
VPA x ROMANTIC	-0.087	0.094	0.88(	0.929
VPA x OPEN	-0.084	0.052	-0.92(	0.916
VPA x EMBARRASSED	-0.060	0.050	-0.69]	0.872
VIDEO	32.649	91.209	-40.86<	82.760
VIDEO x ROMANTIC	-1.955	1.669	1.92<	1.513
VIDEO x OPEN	0.218	1.737	-0.206	1.580
VIDEO x EMBARASSED	1.117	1.939	-0.891	1.795
VIDEO x VPA	24.697	44.048	-20.345	37.900
(VIDEO x VPA) x (ROMANTIC)	0.978	0.903	-0.937	0.779
(VIDEO x VPA) x (OPEN)	-0.835	0.897	0.808	0.767
(VIDEO x VPA) x (EMBARRASSED)	-0.672	0.858	0.573	0.743
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	387.708	19.690	388.153	19.702
Group level				
$Var(u_{0j}) = \tau_{00}$	4.970	2.229	4745.216***	68.886
$Var(u_{1j}) = \tau_{11}$	1.338	1.157	1083.118***	32.911
$Var(u_{0j}) = \tau_{22}$	4549.792	67.452	3650.975	60.423
$Var(u_{1j}) = \tau_{33}$	1037.35	32.208	725.620	26.937
N. parameters		11	11	
Model deviance		23093.40	5445.37	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; ROMANTIC = romantic/passionate SSSS factor; OPEN = open/direct SSSS factor; EMBARRASSED = embarrassed/inhibited SSSS factor. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

Equation 19

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(ROMANTIC)_j + \gamma_{02}(OPEN)_j + \gamma_{03}(EMBARRASSED)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(ROMANTIC)_j + \gamma_{12}(OPEN)_j + \gamma_{13}(EMBARRASSED)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(ROMANTIC)_j + \gamma_{22}(OPEN)_j + \gamma_{23}(EMBARRASSED)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(ROMANTIC)_j + \gamma_{32}(OPEN)_j + \gamma_{33}(EMBARRASSED)_j + u_{3j}$$

Table 14. Multilevel Regression estimate for SSA (Model 1) and VPA (Model 2) as predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Sexual Satisfaction (SSS_W) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	6.407*	2.521	1.950†	0.970
SSS_W	-0.051*	0.021	0.005	0.009
VIDEO	37.551**	13.643	-1.389	0.942
VIDEO x SSS_W	0.076	0.123	0.024*	0.011
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	533.904	23.106	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.829	0.910	1.285***	1.134
$Var(u_{1j}) = \tau_{11}$	409.208***	20.229	1.581***	1.258
N. parameters	4		4	
Model deviance	23781.854		6790.860	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} SSA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SSS\_W)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SSS\_W)_j + u_{1j} \end{aligned}$$

Equation 20

$$\begin{aligned} VPA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SSS\_W)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SSS\_W)_j + u_{1j} \end{aligned}$$

Equation 21

Table 15. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VPA x VIDEO (Level 1), and by Sexual Satisfaction (SSS_W) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-0.943	3.504	28.551	55.188
SSS_W	-0.022	0.032	-0.592	0.534
VPA	3.402**	1.178	5.479	24.921
VPA X SSS_W	-0.013	0.011	0.204	0.242
VIDEO	31.427	55.891	-27.308	51.580
VIDEO x SSS_W	-0.590	0.532	0.503	0.486
VIDEO x VPA	1.396	24.190	-2.513	21.013
(VIDEO x VPA) x (SSS_W)	0.224	0.235	-0.188	0.203
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	386.833	19.668	387.100	19.675
Group level				
$Var(u_{0j}) = \tau_{00}$	2.658	1.630	4485.600***	66.975
$Var(u_{1j}) = \tau_{11}$	1.695	1.302	1062.702***	32.600
$Var(u_{0j}) = \tau_{22}$	443.839	66.587	3741.457	61.167
$Var(u_{1j}) = \tau_{33}$	1001.500	31.646	744.668	27.289
N. parameters	11		11	
Model deviance	23102.960		23104.510	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; SSS_W = sexual satisfaction, total score. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SSS\_W)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(SSS\_W)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(SSS\_W)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(SSS\_W)_j + u_{3j}$$

Equation 22

Table 16. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Sexual Arousal Function (FSFI_A) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	2.286	1.613	1.551†	0.798
FSFI_A	-0.245	0.301	0.19(	0.18
VIDEO	15.244	12.826	-0.691	0.957
VIDEO x FSFI_A	6.670*	21.958	0.392	0.243
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.27	23.114	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.907	0.952	1.264***	1.125
$Var(u_{1j}) = \tau_{11}$	373.420***	19.324	1.860***	1.364
N. parameters	4		4	
Model deviance	23767.631		6782.417	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; FSFI_A = female sexual function index arousal domain; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} SSA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(FSFI\_A)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(FSFI\_A)_j + u_{1j} \end{aligned}$$

Equation 23

$$\begin{aligned} VPA &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(FSFI\_A)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(FSFI\_A)_j + u_{1j} \end{aligned}$$

Equation 24

Table 17. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VIDEO x VPA (Level 1), and by FSFI_A (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-2.217	4.868	91.80	56.313
FSFI.A	0.016	0.970	-27.455	11.59
VPA	2.066	2.694	-24.45	28.16
VPA X FSFI_A	-0.131	0.540	11.245	5.84
VIDEO	97.176	55.533	-91.093	49.33
VIDEO X FSFI_A	-28.171*	11.431	25.621	10.15
VIDEO x VPA	-27.894	26.987	24.94	22.97
(VIDEO x VPA) x (FSFI_A)	11.679*	5.582	-10.390	4.73
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	387.051	19.674	387.365	19.682
Group level				
$Var(u_{0j}) = \tau_{00}$	7.610	2.759	4028.95***	63.474
$Var(u_{1j}) = \tau_{11}$	2.839	1.685	961.666***	31.011
$Var(u_{0j}) = \tau_{22}$	3792.253	61.581	3053.575	55.259
$Var(u_{1j}) = \tau_{33}$	882.916	29.714	614.818	24.796
N. parameters	11		11	
Model deviance	23075.272		23076.683	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; FSFI_A = female sexual function index arousal domain. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
† $p < .07$, * $p < .05$, ** $p < .01$, *** $p < .001$.

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(FSFI\_A)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(FSFI\_A)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(FSFI\_A)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(FSFI\_A)_j + u_{3j}$$

Equation 25

Table 18. Multilevel Regression Estimate for SSA (Model 1) and VPA (Model 2) as Predicted by VIDEO (Erotic = 1; Neutral = 0) (Level 1), and by Sexual Attitudes Scale (SAS) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	1.330	0.817	2.558***	0.346
SAS	-0.007	0.027	-0.005	0.014
VIDEO	54.109***	5.785	2.030**	0.641
VIDEO x SAS	-0.379	0.223	-0.041*	0.020
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	534.323	23.115	0.716	0.846
Group level				
$Var(u_{0j}) = \tau_{00}$	0.737	0.858	1.291***	1.36
$Var(u_{1j}) = \tau_{11}$	386.020***	19.647	1.687***	1.300
N. parameters	4		4	
Model deviance	23779.205		6789.990	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.

- $p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} \text{SSA} &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SAS)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SAS)_j + u_{1j} \end{aligned}$$ Equation 26

$$\begin{aligned} \text{VPA} &= \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SAS)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SAS)_j + u_{1j} \end{aligned}$$ Equation 27

Table 19. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) and VPA x VIDEO (Level 1), and by Sexual Attitudes Scale (SAS) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-1.279	2.188	-68.448**	22.478
SAS	-0.028	0.067	1.59	0.97
VPA	1.576	0.967	48.072**	11.31
VPA X SAS	-0.007	0.033	-0.954	0.42
VIDEO	-68.137**	21.709	58.315*	19.62
VIDEO x SAS	1.663	0.959	-1.51	0.88
VIDEO x VPA	46.882***	10.769	-41.239***	9.231
(VIDEO x VPA) x (SAS)	-0.963*	0.407	0.865*	0.353
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	387.176	19.677	387.519	19.685
Group level				
$Var(u_{0j}) = \tau_{00}$	8.216	2.866	4340.495***	65.882
$Var(u_{1j}) = \tau_{11}$	2.664	1.632	932.272***	30.533
$Var(u_{0j}) = \tau_{22}$	4067.427	63.776	3378.996	58.129
$Var(u_{1j}) = \tau_{33}$	851.585	29.182	596.990	24.433
N. parameters	11		11	
Model deviance	23097.252		23099.131	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
*$p < .05$, ** $p < .01$, *** $p < .001$.

$$\begin{aligned} SSA &= \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}(SAS)_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + \gamma_{11}(SAS)_j + u_{1j} \\ \beta_{2j} &= \gamma_{20} + \gamma_{21}(SAS)_j + u_{2j} \\ \beta_{3j} &= \gamma_{30} + \gamma_{31}(SAS)_j + u_{3j} \end{aligned}$$

Equation 28

Table 20. Multilevel Regression Estimate for SSA as Predicted by VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2) (Level 1) and PANAS Affect Factors (Positive and Negative) (Level 2)

	Model 1 SSA = outcome		Model 2 VPA = outcome	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	2.346	2.227	2.299*	0.977
POSITIVE	0.055	0.082	0.042	0.027
NEGATIVE	-0.191	0.109	-0.074	0.042
VIDEO	10.027	17.003	-0.097	0.568
VIDEO x POSITVE	0.963**	0.323	0.073	0.041
VIDEO x NEGATIVE	1.235	0.857	-0.052	0.063
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	619.558	24.891	0.797	0.893
Group level				
$Var(u_{0j}) = \tau_{00}$	1.253	1.119	1.291***	1.136
$Var(u_{1j}) = \tau_{11}$	289.227***	17.007	1.870***	1.137
N. parameters	4		4	
Model deviance	19114.829		5599.286	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; POSITIVE = positive affect; NEGATIVE = negative affect. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$.

$$\text{SSA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(POSITIVE)_j + \gamma_{02}(NEGATIVE)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(POSITIVE)_j + \gamma_{12}(NEGATIVE)_j + u_{1j}$$

Equation 29

$$\text{VPA} = \beta_{0j} + \beta_{1j}(VIDEO) + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(POSITIVE)_j + \gamma_{02}(NEGATIVE)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(POSITIVE)_j + \gamma_{12}(NEGATIVE)_j + u_{1j}$$

Equation 30

Table 21. Multilevel Regression Estimate for SSA as Predicted by VPA, VIDEO (Erotic = 1; Neutral = 0 for Model 1; Erotic = 0; Neutral = 1 for Model 2), (VPA X VIDEO) (Level 1), and PANAS Affect Factors (positive and negative) (Level 2)

	Model 1 Erotic = 1		Model 2 Erotic = 0	
Variable	Estimate	s.e.	Estimate	s.e.
Fixed effect				
Intercept	-2.733	6.601	-85.820	91.669
POSITIVE	0.197	0.223	-0.534	2.177
NEGATIVE	-0.190	0.535	4.386	4.291
VPA	1.245	3.733	33.330	42.452
VPA x POSITVE	-0.027	0.087	0.360	0.894
VPA x NEGATIVE	0.003	0.273	-0.802	2.113
VIDEO	-83.196	88.348	83.412	80.085
VIDEO x POSITIVE	-0.728	2.081	0.671	1.915
VIDEO x NEGATIVE	4.572	4.116	-4.898	3.646
(VIDEO x VPA)	31.895	40.379	-33.375	34.419
(VIDEO x VPA) x POSITIVE	0.390	0.852	-0.323	0.724
(VIDEO x VPA) x NEGATIVE	-0.797	1.999	1.006	1.690
Random component				
Participant level				
$Var(r_{ij}) = \sigma^2$	448.620	21.181	448.853	21.186
Group level				
$Var(u_{0j}) = \tau_{00}$	21.555	4.643	5311.346***	72.879
$Var(u_{1j}) = \tau_{11}$	6.083	2.466	1221.935***	34.956
$Var(u_{0j}) = \tau_{22}$	4779.816	69.136	3781.939	61.497
$Var(u_{1j}) = \tau_{33}$	1089.888	33.013	745.463	27.303
N. parameters	11		11	
Model deviance	18574.465		18575.200	

Note. SSA = Subjective Sexual Arousal measured with the Arousometer; VPA = vaginal pulse amplitude; POSITIVE = positive affect; NEGATIVE = negative affect. Multilevel estimates for all Models are based on full information maximum likelihood, thus deviances reflect fixed and random components for each model.
* $p < .05$, ** $p < .01$, *** $p < .001$.

$$SSA = \beta_{0j} + \beta_{1j}(VPA) + \beta_{2j}(VIDEO) + \beta_{3j}(VIDEOxVPA) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(POSITIVE)_j + \gamma_{02}(NEGATIVE)_j + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}(POSITIVE)_j + \gamma_{12}(NEGATIVE)_j + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + \gamma_{21}(POSITIVE)_j + \gamma_{22}(NEGATIVE)_j + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + \gamma_{31}(POSITIVE)_j + \gamma_{32}(NEGATIVE)_j + u_{3j}$$

Equation 31

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Vita

Alessandra H. Rellini was born to Gabriella Rizzi and Verginio Rellini in Genova, Italy, on February 28, 1975. Alessandra and her older brother, Paolo Rellini, were raised in Genova and Como, two towns in Northern Italy. After completing her high school diplomas at the Italian Liceo Scientifico Paolo Giovio, in Como, and at Glen Este high school, in Cincinnati, Ohio, she moved to California for her undergraduate studies. Alessandra was a Scholar Student at Whittier College, where she received her Bachelor of Arts in psychology with a minor in art history. Alessandra continued her education at the California School of Professional Psychology, Alameda, where she enrolled in a Ph.D. program in clinical psychology. After receiving her Masters of Arts she joined Dr. Cindy Meston at the Female Sexual Psychophysiology Laboratory, at the University of Texas at Austin where she conducted her research on female sexuality while completing her Ph.D. in clinical psychology. After completing a year of clinical internship at the Yale School of Medicine, Alessandra joined the faculty at the University of Vermont as Assistant Professor in the psychology department.

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